



# An Investment in America's Future Racial /Ethnic Diversity in Mental Health Research Careers

*Report of the National Advisory Mental Health Council's Workgroup on  
Racial/Ethnic Diversity in Research Training and Health Disparities Research*

The National Advisory Mental Health Council Workgroup on Racial/Ethnic Diversity in Research Training and Health Disparities Research conducted these deliberations and prepared this report.

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# Preface

Eliminating disparities in mental health treatment outcomes among various population groups and training a scientific workforce for research on mental disorders that reflects the full racial and ethnic diversity of the Nation are separate but related challenges, and the National Institute of Mental Health (NIMH) is committed to addressing each. This report on Racial/Ethnic Diversity in Mental Health Research Careers, prepared by the National Advisory Mental Health Council's Workgroup on Racial/Ethnic Diversity in Research Training and Health Disparities Research will be a useful tool toward both of these ends.

The NIMH has a long history of supporting minority research training. In light of this history, two particularly significant contributions of this report are found in its analysis of where we have invested training funds over the past several years and in the glimpse it affords us of the yield of this investment in the form of active minority researchers. As enlightening as they are, the available data make it clear that we must find more effective strategies for following the progress of our trainees if we are to monitor trends in the increasing diversity of mental health researchers. The data also make clear the need to develop new strategies for overcoming the barriers that impede career progress of minorities at various, identifiable points along the career continuum. Removing these barriers will require the collective effort of many agencies, organizations, and the private sector, all of which stand to gain from having well-prepared minority citizens as members of research, research education, and health practice teams, working in the best interest of all Americans.

We thank the Council and its Workgroup for developing this report. NIMH will review it carefully and will make every effort to respond productively to the recommendations.

Steven E. Hyman, M.D.  
Director, NIMH



# Executive Summary

Mental disorders adversely affect individuals, family systems, our national infrastructure, and the global economy. In the United States, mental disorders account for more than 15% of the burden of disease from all causes (Murray & Lopez, 1996), and their respective direct costs and indirect costs are estimated to be \$69.0 billion (Mark et al., 1998) and \$78.6 billion (Rice & Miller, 1996). These data (as noted in *USDHHS Mental Health: A Report of the Surgeon General*, 1999) indicate the social effects of mental disorders and reflect their staggering economic impact on our Nation in its entirety. There exist, however, a paucity of empirical data that describe the impact and effects of mental disorders on our Nation's racial/ethnic minority groups, defined in this report as African Americans, American Indians/Alaska Natives, Asian/Pacific Islanders, and Hispanics. Members of these groups remain underrepresented or unreported in most studies of mental illness, although they are overrepresented among the conditions thought to generate susceptibility to, or prolong the effects of, mental illness, such as poverty, racism, homelessness, incarceration, substance abuse, and poor access to health care. Thus the burden of mental illness falls disproportionately on minority groups. The Workgroup believes that an important component in reducing that burden will be to bring a diverse population of research investigators to the task.

Women and other groups, including persons with disabilities, are underrepresented among researchers receiving independent investigator support from the NIMH, and targeted efforts are needed to increase their numbers. This report,

however, focuses on only one aspect of diversity, race/ethnicity.

Since its creation in 1946, the National Institute of Mental Health (NIMH) has introduced a variety of innovative funding mechanisms designed to facilitate career development for mental health researchers in general, and racial/ethnic minority investigators, specifically. Today, NIMH remains a leader at the National Institutes of Health in providing funds for research training and research for racial/ethnic minority scientists. Despite the Institute's efforts, however, the number of racial/ethnic minority investigators in mental health related fields is considered insufficient to meet current or projected demands.

In 1999, the National Institute of Mental Health (NIMH) Director, Steven E. Hyman, M.D., called for an assessment of the Institute's progress in developing racial/ethnic minority investigators. He initially asked staff to convene a workshop that would include interested members of the National Advisory Mental Health Council (NAMHC), junior and senior minority investigators, consultants with expertise in diversity training, NIMH-funded training program directors, NIMH training program administrators, and others concerned with these issues. Upon issuance of a staff report on the workshop findings, the NAMHC established a Council Workgroup to continue the assessment. This group, whose membership mirrored the workshop participants, identified eight focus areas for follow-up study. The foci were clustered into three general domains: (a) the educational context of the racial/ethnic minorities who constitute the

trainee, faculty, mentor, and investigator “pipeline” in the United States; (b) the progress and status of racial/ethnic minority trainees and investigators supported by the NIMH; and (c) recommended actions the NIMH can take to improve racial/ethnic minority representation among trainees and investigators.

The Workgroup analyzed qualitative and quantitative data relevant to each of these domains. To interpret the quantitative data, the Workgroup used several reference points. In all cases, the representation of minorities among NIMH support mechanisms was compared to their representation within the Nation’s population. Given that racial/ethnic minorities are frequently underrepresented within latter stages of the educational pipeline, it is important to apply a second reference point, specifically the ethnic group’s representation in the pool from which the next career stage draws. The former represents an aspirational goal, whereas the latter reflects the available pool from which institutions currently draw to promote minority representation.

The Workgroup met periodically to review findings, consult with subject matter experts, and generate recommendations.

## **Rationale for Increasing Diversity**

The Workgroup developed a three-pronged rationale for increasing the number of racial/ethnic minority scientists. Because these rationales are interrelated, the order of presentation is not meant to suggest their relative merit.

The first rationale derives from information and recommendations developed by the National Research Council (NRC Report, 2000), which recently recommended that there be no aggregate increase, in the United States, of Ph.D.’s in basic biomedical research, behavioral and social science

research, or other fields traditionally associated with clinical research, in light of projections that the current inventory of scientists is sufficient to meet demands until the year 2005. At the same time, however, the NRC recommended that NIH a) increase efforts to identify and support programs that encourage and prepare “underrepresented” minorities for careers in basic biomedical research (p. 30); b) continue efforts to identify and support programs that prepare and encourage underrepresented minorities for careers in behavioral and social science research (p. 41); c) intensify efforts to train and retain physicians in clinical research (p. 52); and d) increase efforts to identify, support, encourage, and prepare underrepresented minorities for careers in clinical research (p. 52). The Workgroup also took note of a National Science and Technology Council report (NSTC, 2000) that projects a shortfall in the scientific workforce by the year 2050 if corrective actions—including an increase in the Nation’s supply of racial/ethnic minority scientists—are not implemented.

The second rationale for this report is grounded in a consensus that more racial/ethnic minority mental health researchers are needed to address the disparities in access to and quality of health care experienced by the majority as well as minority populations in the United States.

The third rationale for an increase, closely related to the second, reflects the need to enrich the scientific knowledge base through increased participation, in every research arena, of both racial/ethnic minority investigators and research participants. The presence of more minority group investigators would encourage more racial/ethnic minority individuals to participate in research. Moreover, both empirical and anecdotal evidence reveals that racial/ethnic minority investigators often have a particular commitment to research designed to address health care disparities.

## Major Findings

Racial/ethnic minority groups are underrepresented among the mental health research workforce. Although the efforts of NIMH (particularly in comparison to those of other National Institutes of Health [NIH] components) to increase their representation are noteworthy, the limited data that are available indicate that progress has been and remains slow. Precise information about the effectiveness or shortcomings of initiatives designed to increase diversity in the mental health research career field is lacking for several reasons, including a) several key initiatives have not been in effect long enough to allow for a full transition from the level of research trainee to that of independent investigator/grantee; and b) an effective trainee tracking system is not in place to determine outcomes.

## The Educational Context

Relative to their representation in the U.S. census, American Indians, African Americans and Hispanics are underrepresented among faculty and graduate/professional students. In contrast, the number of Asian/Pacific Islander faculty and post-baccalaureate students is proportionally greater than in the population at large. At the four-year college level, American Indians, African Americans, and Hispanics are still underrepresented, albeit to a lesser extent than in the post-graduate environment. Only among community college students is underrepresentation either eliminated or nearly eliminated for these three groups. Analyses of high school data reveal that the greatest attrition in the educational development of racial/ethnic minorities occurs prior to high school graduation. According to 1999 census data, nearly half of Latino adults, a third of American Indian adults,

and a quarter of African American adults did not complete high school. The exception, again, were Asian/Pacific Islanders, whose graduation rate (85%) exceeded the national average.

Available evidence indicates that the career path for racial/ethnic minority mental health researchers, particularly American Indians, African Americans, and Hispanics, has numerous points of attrition that extend from high school through post-doctoral training and into careers in academia/research.

The increase in numbers of American Indians, African Americans, and Hispanics enrolled in community colleges, which now approximates the proportion of these groups in the Nation's population, is encouraging. This trend suggests that, with proper encouragement and support, programs that remove impediments to higher levels of education can help improve graduation rates and lead, in turn, to a larger pool of potential investigators.

## Progress at NIMH

At present the representation of minority group members among NIH/NIMH-funded researchers and trainees parallels minority representation within U.S. educational institutions. Few minority investigators submitted research applications in 1999 and even fewer were funded. American Indians, African Americans, and Hispanics, who account collectively for some 24% of the U.S. population, submitted only 5.2% of all applications to NIMH that year and, ultimately, accounted for only 3.9% of funded applicants. Asian/Pacific Islanders again are an exception; they made up 3.7% of the 1999 U.S. population and 5.5% of NIMH grant recipients in the same year. When compared to an estimate of the potential pool of applicants, that is, minority representation among faculty members (8.4% for

American Indians, African Americans, and Latinos combined, and 5.8% for Asian/Pacific Islanders), under-representation of minority grant applications is still apparent, though significantly reduced.

Overall, the general pattern of racial/ethnic minority representation among submitted and funded applications observed at NIMH holds true across all the NIH Institutes and Centers. This is a disappointing outcome given that NIMH investments in minority training historically have been and remain considerably higher than the NIH average.

Two key institutional grant programs (T32s) are the Underrepresented Minority Fellowship Programs (UMFPs) (National Research Service Award [Institutional NRSA]) and University-Based Programs (UBPs). Although there are fewer UMFPs (N = 6) than UBPs (N = 197), the UMFPs contribute disproportionately to the training of future minority investigators, especially African Americans. African Americans and Hispanics are not fully represented in UBPs according to their numbers in the U.S. census.

In 1998, American Indians, African Americans, and Hispanics made up 24% of the population and together accounted for 16.9% of NIMH-funded trainees in all T32 training programs. Given that these three groups generated only 13.6% of baccalaureate recipients in 1997—an estimate of the available pool—NIMH appears to be supporting a substantial number of racial/ethnic minorities on the T32 training programs. Outcomes for Asian/Pacific Islander trainees were much better than the outcomes for the other racial/ethnic groups. The proportion of Asian/Pacific Islanders among NIMH trainees (7.5%) exceeds both their representation within the U.S. population (3.6%) and among baccalaureate recipients (5.7%). It is encouraging to note that in all cases the proportion of funded racial/ethnic minority trainees exceed the groups'

proportion of baccalaureate recipients. However, minority groups' representation in training programs continues to fall short of most minority groups' national representation.

In addition to the two key institutional grant programs (T32s), NIMH supports a variety of individual training mechanisms designed to play a key role in the career advancement of racial/ethnic minorities. These include the Mentored Scientist Development Award for New Minority Faculty (K01), Minority Supplements, Individual Minority Fellowship Awards (F31), and Minority Dissertation Awards (R03), as well as generic career development awards (K01, K08, K23, etc.) that are available to individuals of any racial/ethnic group.

Available data indicate that the Minority Supplement is used quite effectively. In 1998 and 1999, NIMH allocated a greater percentage of its minority research training expenditures to Minority Supplements than did any other NIH component. Although the time frame of this evaluation (1997-2000) is limited, early outcomes for recipients of the Supplements strongly suggest their promise as a tool for developing independent investigators. Longer-term follow-up of awardees is critically important to determine post-supplement career activity.

The principal finding regarding other individual training and research development awards, particularly the minority-focused mechanisms, is that they attract few applicants. The extent to which racial/ethnic minority investigators and trainees apply for and receive the generic career development awards is not clear.

## **Conclusion**

Training racial/ethnic minority mental health scientists is critical to the quality of the Nation's health care as well as to our broader national economic welfare. The current and projected numbers of racial/ethnic minority investigators and faculty are insufficient to fill future shortfalls in the Nation's science and science education workforce. The dual needs to address health disparities among racial/ethnic minorities and to make the human participant base much more diverse underscores the importance of strategies for dramatically increasing the numbers of underrepresented racial/ethnic minority scientists. Moreover, increasing diversity in the active training pool will have a sensitizing impact on the training environment, resulting in a better trained and appropriately sensitive mental health workforce to serve all of the Nation's citizens more effectively.

The attrition of racial/ethnic minorities at various points along the progression from student to faculty and from NIMH-supported trainee to NIMH-funded investigator must be addressed. Current efforts within higher education and at NIH/NIMH are not meeting the Nation's needs for a racially and ethnically diverse pool of researchers overall, and of mental health researchers in particular. This is true even though NIMH has committed a relatively larger proportion of its available dollars toward training and career development than has its sister Institutes.

Multiple initiatives clearly remain necessary to enlarge the pool of racial/ethnic minority investigators. That said, the Workgroup attaches particularly high priority to its recommendations for 1) systemic improvements in methods for tracking the academic and career paths of trainees so that training programs can be optimized for successful outcomes and so that career assistance can be focused at critical transition periods, and

2) encouraging and strengthening the roles of research career mentors. The Workgroup views decisive action in these areas as essential cornerstones to all of the recommendations presented in this report.

## **Recommendations**

The NAMHC Workgroup for Initiatives on Racial/Ethnic Diversity in Training and Health Disparities Research urges NIMH to continue its leadership and commitment to training for diversity. Common to all of the recommendations that follow is the Workgroup's perception of the need for a fundamental reorientation of NIMH racial/ethnic minority research training priorities that would result in the successful incorporation of diversity training into the fabric of America's mental health research agenda.

The Workgroup applauds Congress and the NIH for the emphasis now assigned to reducing and ultimately eliminating health disparities. This report is timely in that it links training and career development to the need for researchers who will address these issues. The NIMH must combat what 1999 workshop participants and some members of the Workgroup perceive as a tendency on the part of the larger scientific community to devalue research addressing the ethnic and cultural health issues that are important to reducing health disparities.

The reorientation must recognize the fact that the information revolution has raised questions about the belief that meritorious research can only be performed at category I and II research universities (i.e., those institutions which award 50 or more doctoral degrees annually and receive at least \$40 million and \$15.5 million in annual Federal research support, respectively), with mentoring and trainee infrastructure onsite.

The Workgroup believes that given persistent constraints on resources and the urgent need to increase the number of racial/ethnic minority researchers, the Institute must place special emphasis on research training support at the doctoral and post-doctoral levels.

The multiple challenges of enhancing ethnic minority mental health research training require that a redirection of the NIMH program be visionary and robust; to have a significant impact on the quantity of racial/ethnic minority researchers, it must be operationalized by scientists in the laboratory, through the tenure track system in academia, to the career patterns of service center professionals.

A successful reorientation will enhance the Institute's ability to recruit, sustain, advance, and retain racial/ethnic minority mental health researchers at the independent investigator level.

Finally, successful approaches to racial/ethnic minority research training would encompass mechanisms required to study causal factors in health disparities, and would inculcate the fundamental concept that racial/ethnic diversity in the learning environment is a pedagogical factor that enriches the quality of the learning experience for every person in the educational environment.

The Workgroup believes that systemic improvements in two key areas—tracking training outcomes and strengthening mentorship capacities—are critical if NIMH is to rectify the paucity of racial/ethnic minority investigators. Recommendations regarding these needs are cornerstones of the Action Plan.

## **Recommendation No. 1**

***Create a tracking system to monitor the career progression of NIMH-supported trainees through the investigator level so that training can be optimized based on outcomes.***

Though the analysis of the training data in this report reflects a positive academic progression for the majority of the trainees, further analysis of the talent pool is not possible due to the absence of standardized information about trainee performance and post-graduate activity. This type of information would be readily available in a centralized trainee tracking system that this Workgroup recommends for implementation. The system would support a partnership between the NIMH, mentors, trainees, and investigators. A trainee tracking system provides early identification of education transition points and issues that influences attrition, stimulates specialty selection, and contributes to trainee advancement to the next level of career progression. Most importantly, a trainee tracking system would indicate which funding mechanisms are successful and which need revision or elimination.

Trainee tracking would contribute to a more thorough analysis of the NIMH research portfolio and of the return on investment of its training dollars.

In summary, without the ability to track the progress of trainees funded by the NIMH, the outcomes of all the interventions put in place to help ensure the success of trainees in furthering their careers toward the end of becoming independent researchers, research academicians, clinician scientists, and so on cannot be reliably determined or readily improved.

## **Recommendation No. 2**

### ***Establish a national mental health research mentorship program devoted to training racial/ethnic minority investigators.***

One facet of the program would be to develop a national mentorship network of successful minority and non-minority senior investigators within the context of specific research projects. Mentorship networks are encouraged to promote junior investigators and trainees between class I and II research universities and other colleges and universities. Some mentors would be available through the R25 (see Appendix F for definition) and T32 mechanisms to mentor racial/ethnic minority investigators or trainees over an extended period of time.

Another facet of the mentorship program would be the creation and maintenance of a centralized career development system that uses a team of managers at NIMH to track and guide the progress of racial/ethnic minority trainees and scholars. The career managers would identify minority applicants in need of additional support (e.g., a racial/ethnic minority investigator whose application fell just short of funding, re-entering investigators, or field switchers in critical shortage areas such as child psychiatry). Another suggested component of the mentorship program is the provision of technical assistance (TA) by NIMH staff, through a 1-800 TA/referral hotline.

## **Recommendation No. 3**

### ***Concentrate more new resources at the later stages (post-doctoral and beyond) of career development.***

Given the complexity of research today, it appears that most trainees need to have post-doctoral

training and supervised research career development if they are to develop their full capacity to do independent, innovative research.

This recommendation complements the emphasis of the proposed national mentorship program that is directed at the later years of career development.

## **Recommendation No. 4**

### ***Encourage new and strengthen existing networks and partnerships to enhance science training goals that exceed NIMH resource capabilities.***

Among institutions with which NIMH might encourage networks are the Department of Education, the Department of Justice, the National Science Foundation, Native American tribal colleges, Hispanic-serving institutions, predominantly African American colleges and universities, and pharmaceutical industries. Partnering within the NIH (e.g., National Institute of General Medical Sciences [NIGMS] and NIMH) and intramural and extramural programs can be strengthened. A particularly rich opportunity for recruitment of minorities into the research career pipeline is the community college system. Educational outreach needs to be formed to help forge bridges between the NIMH-supported high school Career Opportunities in Research Education and Training (COR) Program (R25), community colleges, and the COR Honors Undergraduate Training Program (T34) for college juniors and seniors.

## **Recommendation No. 5**

### ***NIMH is encouraged to a) ascertain that Initial Review Group memberships are diverse and, where relevant, possess***

***expertise needed to evaluate research in minority populations/communities and b) enforce sanctions for programs that fail to attract racial/ethnic minority trainees when such criteria are stipulated in the funding mechanisms.***

During the preparation of this report the Workgroup noted constituency concerns about the application review process, racial/ethnic minority membership on review panels, and health disparity issues. The scientific review of grant applications and contract proposals is a key element in the fair and relevant distribution of NIMH funds to the national research and research training community. It is essential that the membership of each review group reflect the cutting-edge scientific knowledge necessary to judge the merit of research and research training methodologies; it is equally critical that review group members be alert to cultural nuances and influences that, if unchecked in the group's review process, can lead to systematic variance—and bias—in research approaches.

## **Recommendation No. 6**

***We encourage NIMH to conduct an annual review of plans for racial/ethnic diversity in mental health research careers and of the strategic plan for reducing health disparities to assess progress made in implementing the action plans. NIMH should then report its findings to NAMHC.***

The Workgroup wishes to emphasize the importance of continuous assessment and reporting of a) outcomes of racial/ethnic minority research training and research initiatives, and b) trainee/investigator progression.

The Workgroup believes the information summarized above and detailed in chapters II through VI will help the NIMH recruit, train, and retain racial/ethnic minority mental health researchers.

# Chapter I.

## Prologue

The National Institute of Mental Health (NIMH) has a long history of concern with the lack of ethnic diversity among mental health researchers. Over the years—and particularly since the 1960s, when the Civil Rights movement called the Nation's attention to patterns of racial discrimination in American society—NIMH has taken a number of steps to increase the representation of ethnic minorities among investigators. In the sixties, NIMH supported over 600 individual fellowships and had a professional staff of three psychologists and an anthropologist to work with individual fellowship applicants and awardees. However, the number of minority students who applied for fellowships was disappointingly low. University-Based Programs (UBPs) (T32s) supported by NIMH also had difficulty in recruiting persons from diverse ethnic groups.

By the late sixties and early seventies, groups of minority students and faculty had begun to pressure mental health professional organizations to be more responsive to the needs of minority communities. For example, an ad hoc group of African American sociologists challenged Dr. N. Jay Demerath, the Executive Director of the American Sociological Association (ASA), to increase the number of African Americans within the profession. By way of response, Dr. Demerath proposed to NIMH that the Institute fund a training grant to the ASA that would enable the organization to recruit minority students into graduate programs in sociology, to mentor them

while they were in graduate school, and to provide some financial support while seeking partial tuition support from universities. The arrangement would constitute a three-way partnership involving ASA, NIMH, and university departments. This program was initially funded in 1972, and models of it were adopted by other professional organizations. By 1974, NIMH had awarded over \$5 million to five professional organizations to provide support for fellowships designated for minority students in graduate training programs in sociology, psychiatry, psychology, nursing, and social work. In the late 1980s, a program in neuroscience was added. These programs are referred to as Underrepresented Minority Fellowship Programs (UMFPs).

In 1980, Congress enacted the Mental Health Systems Act (P.L. 96-398), which authorized NIMH to establish a position of Associate Director for Special Populations. NIMH subsequently established an Office for Special Populations (OSP) that would be responsible for overseeing activities at NIMH concerning underrepresented groups, including ethnic minorities.

Over the years many initiatives have been undertaken at NIMH, including the introduction of new grant mechanisms designed to specifically target ethnic minority trainees and investigators. Numerous technical assistance workshops have been conducted to recruit minority trainees and investigators into the career field. Steps have been taken to increase minority representation among review committees. Despite these and other efforts, the number of minority researchers who

have obtained investigator-initiated research grants has been less than expected.

In 1999, concerned about the slow rate of progress, the National Advisory Mental Health Council (NAMHC) (see Appendix A for a list of members in 1999) formed a Workgroup (see Appendix B for a list of members) to examine the Institute's efforts in this area and to recommend ways to improve the yield of those and related efforts.

This Workgroup's report to the NAMHC (see Appendix C for a list of current members) defines racial/ethnic minority groups in accordance with the description of underrepresented minorities used by the Office of Management and Budget. These groups include African Americans, American Indians/Alaska Natives, Asian/Pacific Islanders, and Hispanics (Latinos). The Workgroup recognizes that there is great diversity within each racial/ethnic group. For example, the aggregate Asian/Pacific Islander group subsumes several specific ethnic groups, from the largest groups of Chinese and Filipinos to the smaller groups of Hmong and Cambodians (Lee, 1998). Since within-group data are rarely analyzed, this report will present the data for the four main racial/ethnic groups only.

The Workgroup is aware that women and other groups, including persons with disabilities, are underrepresented among investigators receiving research support from the NIMH, and targeted efforts are needed to increase their numbers. However, this report focuses on race/ethnicity only.

The Workgroup chose to use the combined terminology "race/ethnicity" to refer to underrepresented minority groups. Some investigators consider "race" to be a necessary term because it refers to the social meaning that Americans tend to ascribe to groups, which in

some instances reflect prejudice and racism (e.g., Jones, 1991). Other researchers are open to possible biological factors associated with race—for example, the relationship of race to differential rates of metabolizing psychotropic medications (e.g., Lawson, 1986; Lin, Poland & Anderson, 1995). Historically, the biological study of race, however, has been fraught with problems in both method and conceptualization (American Anthropological Association, 2000; Owens & King, 1999; Zuckerman, 1990). Factors associated with race are sometimes presumed—erroneously—to be causal in nature when, in fact, the relationship between race and biology is weak at best. Risks inherent in implicating biological factors in understanding race have prompted others to recommend phasing out the term "race" and using "ethnicity" or "ethnic origins" to describe the identities of different groups in the United States (American Anthropological Association, 2000). The Workgroup strived to balance sensitivity to these diverse perspectives with the focus of this report on minority groups within their social context, and thus selected the term race/ethnicity as a social construct in describing the four groups under study—African Americans, American Indians/Alaska Natives, Asian/Pacific Islanders, and Hispanics.

Against this backdrop, the goals of the NAMHC Workgroup are to:

- Explain the importance of having a sound plan to recruit, sustain, and retain racial/ethnic minority researchers.

- Detail initiatives already undertaken by NIMH to produce racial/ethnic minority mental health researchers.

- Recommend goals, objectives, and an action plan that will result in a significant increase in the number of ethnic minorities who become independent investigators.

## **Workgroup Charges and Focus Areas**

In 1999, the NAMHC requested that the Institute examine its efforts to support minority trainees and investigators. Similar, earlier requests had resulted in thorough, useful analysis of disparate NIMH research programs including childhood mental disorders, prevention, mental health services, and behavioral/social sciences. Acting on the Council's request, NIMH Director Steven E. Hyman, M.D., charged the Workgroup to address three general domains: (a) the educational context of minorities in the United States, (b) the current status of minority trainees and investigators at NIMH, and (c) recommendations to improve minority representation among trainees and investigators. In addition to addressing the three general domains, the Workgroup gave itself a fourth charge—to articulate a clear rationale for increasing the racial/ethnic diversity of minority investigators funded by NIMH.

The four charges and the specific focus areas within each domain are as follows:

### ***RATIONALE FOR DIVERSITY***

Develop a clear rationale for increasing the racial/ethnic diversity of minority investigators funded by NIMH.

### ***EDUCATIONAL CONTEXT OF RACIAL/ETHNIC MINORITIES***

The career life cycle of ethnic minority mental health scientists.

The recruitment mix at each part of the training pathway.

Factors related to ethnic minority underrepresentation among full-time faculty.

## ***CURRENT STATUS OF RACIAL/ETHNIC MINORITY TRAINEES AND INVESTIGATORS SUPPORTED BY NIMH***

NIMH's support of racial/ethnic minority scientists throughout the career life cycle.

## ***SUBJECT AREAS FOR RECOMMENDATIONS TO IMPROVE MINORITY REPRESENTATION AMONG TRAINEES AND INVESTIGATORS***

The best way to access the training pipelines.

How NIMH can improve training outcomes at each level along the research career development pathway.

Where NIMH can have the greatest impact along the career life cycle to increase the number of minority researchers.

Methods NIMH can use to stop losses during the later years of career development.

Alliances NIMH should foster to help meet training needs.

## **Strategic Plan for Reducing Health Disparities**

As the Workgroup addressed training and research matters for minorities, the NIH leadership team of Harold Varmus, M.D., Director, NIH, and Ruth Kirschstein, M.D., Deputy Director, NIH, established research on health disparities as a prominent NIH-wide initiative. The Workgroup, with its significant expertise in minority issues, was asked by Dr. Hyman to identify ways to improve the NIMH Strategic Plan for Reducing Health Disparities and to suggest priority areas for FY 2001, and that task resulted in a second important product of the Workgroup: the NIMH Strategic Plan for Reducing Health Disparities (located at <http://www.nimh.nih.gov/strategic/strategicdisparity.cfm>). After extensive review of

the draft NIMH Strategic Plan for Reducing Health Disparities, the Workgroup offered recommendations for enhancing it, identifying research training as the top priority.

## **Guiding Principles**

Three principles guided the development of this report:

The Workgroup believes that empirical observations are essential for NIMH to evaluate its programs. Therefore, to the extent possible, recommendations are data driven.

The primary business of NIMH is to support investigator-initiated research and to train investigators to carry out its research mission. The Workgroup recognizes that enhancing the research skills of high school, undergraduate, and pre-doctoral students is critical to generating a pool of potential investigators; however, this report focuses on ways to provide post-doctoral and young investigators with the necessary skills to conduct independent research. The Workgroup believes that this focus will result in the greatest impact on increasing the number of minority researchers and, ultimately, the improved health of all Americans.

While acknowledging the key role that NIMH plays in addressing the Nation's mental health research and research training needs, the Workgroup also recognizes that the Institute must collaborate with other NIH components and with educational institutions, professional associations, private foundations, and mentors. Intra-NIMH collaborations (i.e., cross-divisional) also are essential. Effective collaborations will enable NIMH to apply its limited resources most effectively at the critical junctures identified through ongoing evaluations. Finally, a collaborative spirit likely will strengthen existing partnerships and suggest opportunities for new ones needed to address training areas (e.g.,

kindergarten through community college) that are beyond NIMH's resource capabilities.

## **Workgroup Composition**

The Workgroup was composed of interested NAMHC members, training site program administrators, and researchers whose knowledge and skills complemented those of the Council representatives. Members' expertise encompassed psychology, neuroscience, psychiatry, social work, anthropology, sociology, and public health. Council member Javier Escobar, M.D., served as Chair, and Council member Roy Wilson, M.D., served as Co-chair of the Workgroup.

## **Workgroup Procedures and Process**

The Workgroup used three approaches to carry out its charges. First, NIMH sponsored a workshop in October 1999 to collect both quantitative and qualitative data regarding the progress of minority trainees and investigators. A summary of the workshop proceedings is at [http://www.nimh.nih.gov/research/minority\\_training.pdf](http://www.nimh.nih.gov/research/minority_training.pdf) and a roster of participants can be found in Appendix D.

At the workshop, NIMH staff presented in-house data regarding the Institute's support of minority trainees and investigators. The information was particularly helpful in identifying how minorities fare in discrete NIMH components as well as in the Institute in its entirety. Data presented at the workshop subsequently were updated and are the foundation of many of the analyses presented in this report. In addition, the workshop involved junior and senior investigators and training directors, who reported their personal experiences and qualitative and quantitative data. These presentations were useful in identifying the barriers to research careers as well as the steps

that can facilitate such careers. After the workshop, the NAMHC established the Workgroup to further assess the issues.

A second procedure used in developing this report was a review of national reports, national databases, and scientific literature concerning training (e.g., *The Chronicle of Higher Education*, 2000; the National Science and Technology Council Report, 2000; the National Research Council Report, 2000; and various NIH databases). These sources were particularly helpful in identifying the educational outcomes of racial/ethnic minorities from high school through graduate education.

A third essential step in developing the report was a series of periodic meetings by Workgroup members to analyze materials, discuss, and draft several iterations of this final report. These meetings were augmented with input from outside consultants (Appendix E), conference telephone calls, electronic mail messages, and subgroup meetings.

## **Report Organization**

This chapter introduces the need for and the processes involved in preparing the report.

Chapter II presents the rationale and importance to the United States of racial/ethnic minority trainees and investigators. Chapter III provides an overview of the status of racial/ethnic minorities throughout the educational system. Data are presented regarding students—extending from high school to the graduate level—and faculty. In Chapter IV, the focus shifts specifically to NIMH and examines how minority trainees and investigators fare across the various funding mechanisms (see Appendix F for a list of frequently used mechanisms). Chapter V considers the importance of mentorship and trainee tracking to the success of a research career, and Chapter VI presents the Workgroup's recommended Action Plan. The Action Plan is an elaboration of the Workgroup's principle recommendations, and it is intended to suggest how the NIMH can contribute to building a stronger, ethnically diverse pool of independent mental health researchers.

## **Acknowledgment**

The Workgroup extends its appreciation to all who contributed to its understanding of the ethnic minority training issues, health disparity challenges, and national science workforce demographics.



# Chapter II.

## **The Importance of Racial/Ethnic Diversity in Mental Health Research and Research Training Programs**

Among the many challenges that confront the Nation in the 21st century, one of the most urgent is to address health and health care disparities experienced by many citizens and disproportionately by members of racial/ethnic minority groups. Central to the challenge of health disparities are the related problems of insufficient scientific information about racial/ethnic minority groups and of a low number of racial/ethnic minorities who attain advanced academic degrees. Sustained attention and a commitment to resolving these issues are imperative to the economic soundness and scientific leadership of the Nation and to the health of its people. Toward that end, this section of the report presents salient issues that undergird an action plan intended to improve the outcome of the Nation's efforts to produce independent racial/ethnic mental health researchers.

## **The Importance of a Diversified Racial/Ethnic Mental Health Research Community**

A recent analysis of demographic data relevant to America's Science, Technology, and Engineering (ST&E) workforce warns of a "national crisis" that

will occur by the year 2050 unless aggressive recruitment, training, career development, and employee retention activities needed to sustain America's entire ST&E workforce are immediately initiated among ethnic minority groups. The projected crisis will stem from the "aging" of America's ST&E workforce, combined with a current inability to replenish from American citizens in general, and its ethnic minority citizenry in particular, key segments of the workforce that require individuals with advanced scientific training and education. The challenge of buttressing the scientific workforce is formidable, yet the Nation's racial/ethnic minority groups contain the talent pool needed to accomplish the task and their development is essential.

A vitally important component of ST&E capacity, of course, is seen in health research, broadly defined. The urgency of expanding the ethnic diversity of the Nation's mental health research community has been expressed in diverse forums. The National Research Council (NRC), for example, recently analyzed the national need for biomedical and behavioral scientists and provided findings and recommendations to NIH (NRC Report, 2000). The NRC determined that there should be no increase in the aggregate number of Ph.D.s. and that the extant supply of Ph.D.s in basic biomedical, behavioral, and social science research is sufficient to meet current demands. However, the NRC recommended to the NIH that it should:

- Increase efforts to identify and support programs that encourage and prepare "underrepresented" minorities for careers in basic biomedical research (p. 30).

- Continue efforts to identify and support programs that prepare and encourage “underrepresented” minorities for careers in behavioral and social science research (p. 41).
- Intensify efforts to train and retain physicians in clinical research to reverse an ongoing decline in the supply of physician scientists and health care doctorates (p. 52).
- Increase efforts to identify, support, encourage, and prepare underrepresented minorities for careers in clinical research (p. 52).

The importance of racial/ethnic minority communities to a successful resolution of the projected shortfall in the scientific workforce was underscored with enactment of the Minority Health and Health Disparities Research and Education Act of 2000. The new law established a National Center on Minority Health and Health Disparities Research at NIH. It mandates research on ethnic minority health issues as well as the education and training of minority health professionals. Language in the Act reports that only 15.5% of the behavioral research-oriented psychology doctorate degrees and 17.9% of the practice-oriented psychology doctorate degrees were awarded to minority students in 1997 (S. 1880-3).

Barriers to attainment of higher ST&E education were addressed recently also by the National Science and Technology Council (NSTC, April 2000). This analysis showed that the ST&E workforce is sustained by the entry of people approximately 22 years of age who have science and engineering degrees.

According to Bureau of the Census projections as depicted in Figure II-A (NSTC, 2000), non-Hispanic White males, who at present constitute the majority of the U.S. ST&E workforce, will decline as a percentage of the workforce population, ages

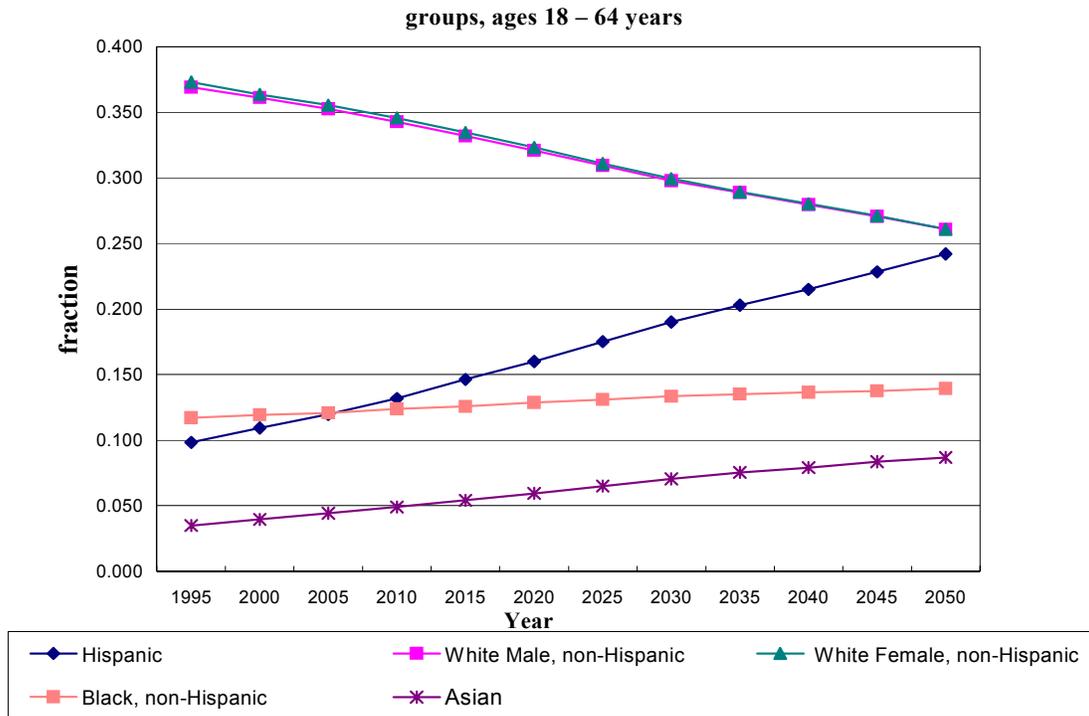
18 to 64, from 37% in 1995 to 26% by 2050. During this same period, racial/ethnic minorities are projected to increase from approximately 25% to 48% of the workforce. Specifically, the percentage of African Americans is projected to increase from 12% to 14% and that of Hispanics will more than double (10% to 24%). The percentage of Asian/Pacific Islanders will also more than double (4% to 9%). Native Americans will remain less than 1%, while non-Hispanic Whites are projected to decline from 74% to 52% of the workforce population.

A forecast of the ST&E workforce for the year 2050 shows that in the absence of a successful intervention that will increase the rate of graduation-age people who earn Science and Engineering (S&E) bachelor’s degrees, the calculated fraction of 22-year-olds who earn an S&E bachelor’s degree and enter the workforce will decline 9% from 1995 to 2050. Should this decline occur, two plausible courses of action would be either to send ST&E jobs offshore or to increase reliance on the immigration of ST&E workers into the United States.

Though the United States remains the recognized leader in the global business and ST&E community, the rest of the world continues to advance. However, to keep pace with global competition, the United States has had to rely on a variety of initiatives that include increasing the number of temporary visas (H-1B visas) for skilled foreign workers. In fact, the number of H1-B visas nearly doubled between 1998 and 1999 to 115,000, and an allowance of 200,000 annually was proposed for succeeding calendar years (NSTC, 2000).

The Nation’s increasing dependence on immigration to meet its ST&E workforce needs may prove to be shortsighted if the immigration conduit becomes unreliable. In the 1980s, between 500 and 1,000 scientists, including Nobel

**Figure II.**  
Bureau of the Census Population Projections for the Ethnic and Gender Groups, Ages 18–64 Years



Source: National Science and Technology Council Report, 2000.

Prize winners, returned to Taiwan to serve as senior faculty and directors of laboratories, often in national centers of excellence. In recent years, moreover, the majority of science and engineering graduates from Korea and Taiwan have returned to their countries of birth upon completion of graduate studies in the United States. Just as the United States benefits from an ethnically diverse ST&E workforce, the Nation must maintain its global perspective through the presence of diverse foreign students and researchers in support of international academic, research, and industrial ventures.

It is the opinion of the Workgroup that increased diversity in the national science workforce will help to produce the economic and psychological well-being necessary to advance U.S. interests in the 21st century. An ethnically diverse workforce should have the capability and confidence needed to sustain the national economy and the national

will during times of crisis (e.g., natural disasters and technological accidents, political and economic uncertainty, as well as diplomacy failures, military misadventures, and hostile actions that threaten the Nation's vital interests).

Strategies for enhancing diversity in the labor pool are already evident in many areas of private industry, science, education, Federal and State government, and the military. The national competition for the best and brightest ethnic minority talent is tremendous. Incentives such as large monetary bonuses, reimbursement for relocation expenses, health plans, spousal employment preferences, loan forgiveness, definitive career patterns, and generous family education packages are among the techniques being used to lure the "best and brightest" from one career field to another.

The Action Plan presented in this report will serve as an effective tool to direct the recruitment, sustainment, and retention of ethnic minority investigators required for national science and public health initiatives. The recommendations serve to bolster the Nation, rather than to establish racial preferences, set quotas, or redress prior social injustices.

## **Ethnic Minorities and Disparities in Mental Health**

The mission of the NIMH is to reduce the burden of mental illness through research on brain, mind, and behavior. NIMH also takes the lead in understanding the impact of behavior on HIV transmission and pathogenesis, and in developing effective behavioral preventive interventions. In the United States and globally, mental disorders are associated with an immense burden of disability. Major depression, schizophrenia, bipolar disorder, and obsessive-compulsive disorder rank among the 10 leading causes of disability in the world (Murray & Lopez, 1996). Although these and other severe mental disorders appear to have largely equivalent prevalence rates across majority and minority populations, they exert a disproportionate impact on racial and ethnic minority groups (USDHHS, 1999). Access to adequate services is uneven at best within the communities where minority populations reside. Where data do exist, outcomes of illness as well as treatment available to minority groups have been shown to be poorer than in majority populations.

To address these issues, the NIMH has placed increased emphasis on achieving a more ethnically diverse pool of investigators and caregivers. One compelling rationale for this action is the likelihood that racial and ethnic minority researchers possess the necessary motivation, persistence, and insight to effectively address disparities in mental health care. NIMH is aware, too, that an important outcome of diversity

in the active training pool is the pedagogical impact of a training environment in which racial/ethnic minorities enrich the attitudes and insights of non-minority mental health investigators and caregivers.

A review of the literature suggests that disparities in the Nation's mental health care system (i.e., specialty care providers, primary care and general medical providers, voluntary organizations, and the human services sector) can be attributed to a variety of factors. One is an insufficient supply of health care resources. In addition, the cost and access to care, the complexity and duration of treatment, the setting of care, and stigma and fear compound the issue of health disparities among ethnic minority populations.

Many members of ethnic minority groups feel ill at ease within a mental health system that has been shaped, in large part, by middle-class cultural values and beliefs that are grounded in theories, procedures, research, and jargon derived primarily from European experiences and culture (Surgeon General, 1999). Racial/ethnic minorities' concerns about the appropriateness of care and provider competence can be exacerbated when patients encounter providers who do not understand the nuances of language, traditional beliefs, social customs, and religious perspective.

Services provided by the mental health care system are intended to have positive outcomes, but they can also be associated with negative consequences. Behaviors may be defined as a "clinical mental condition" that is subject to mitigation due to a diminished personal responsibility or as a "personality disorder" that is subject to sanctions due to the assumption of full responsibility for willful behavior. The outcomes (e.g., voluntary or involuntary hospitalization, continued access to or loss of benefits, and diversion or incarceration) in either case depend on the ability of the mental health provider to

render the appropriate diagnosis and correct mental health care (Lopez, 1989;

Snowden & Cheung, 1990). Clearly, it is crucial that mental health diagnostic and clinical procedures be grounded in the best available science for all racial/ethnic groups.

The Workgroup considers it essential that translational research linking basic and applied sciences include studies that reflect the rich racial and ethnic diversity of the United States. Health disparities research likely both contribute to and benefit from pharmacogenomics research in so far as evidence suggests that certain racial/ethnic minority group members may metabolize psychotropic medications at different rates than the average rates seen in the majority population. The findings could have major clinical implications (Frackiewicz et al., 1997; Collazo et al., 1996). Among other important research opportunities are hypotheses that cultural differences are expressed in the affective, cognitive, and behavioral symptoms of mental disorders; through research, it might be possible to ascertain and reduce the potential for misdiagnosis due to miscommunications. The hypothesis that diagnosticians of a cultural background similar to that of the patient provide more accurate diagnoses and better treatment outcomes needs to be tested. Research conducted to date has not adequately addressed this hypothesis. In neurobiology, research examining the neurocircuitry of anxiety may prove to be relevant to an understanding of disparities (Goddard & Charney, 1997; Coplan & Lydiard, 1998; Sullivan et al., 1998). Racial/ethnic minority group overrepresentation in exposure to stressful and fear-producing life events can contribute to and benefit from advances in research on neurotransmitter alterations in situational anxiety reactions, anxiety disorders, and post-traumatic stress disorders. Similarly, the potential factors involved in mitigating or buffering the effects of stress and anxiety among minority groups need to be examined.

The Workgroup believes that ethnic minority investigators who present an interest in studying diverse populations and who are competent in engaging ethnic minority communities in the research process will contribute significantly to research on health disparities. With respect to this and other research goals, the Workgroup emphasizes that expanding the pool of mental health scientists from underrepresented ethnic minority groups is not simply a matter of affirmative action or of achieving proportional representation. More critically, in the study of health disparities and other topics, these investigators will a) contribute a sensitizing influence on attitudes and insights of non-minority mental health investigators and caregivers, b) enhance the scientific basis of our understanding of human behavior, and c) contribute to better health for all Americans.

## **Expanding the Scientific Knowledge Base by Increasing Racial/Ethnic Minority Participation in Research Protocols**

To address racial/ethnic disparities in mental health, it is important that research participants, as well as investigators, reflect the diversity of our country. Relatively few published research reports focus on ethnic minorities. Graham (1992) found that among the 14,542 quantitative papers published in six flagship journals of the American Psychological Association from 1970 to 1989, only 3.6% focused on African Americans. For this small number of articles, the investigators either specifically stated that African Americans were the population of interest or the data were analyzed by race/ethnicity. It is worth noting, moreover, that since the early 1970s there has been a significant decline in the number of published

articles with a specific focus on African Americans. In 1974, 49 such articles appeared in the journals surveyed; by 1989, only 11 reports that focused on African Americans were published in the same journals. There has been even less research concerning Hispanics. In nearly identical analyses of the same leading journals, Castro and Ramirez (1997) found that less than 1% of the published articles over a 25-year period (1970-1994) focused on Hispanics. While recent trends showing increased ethnic/minority participation in clinical trials are encouraging, efforts still should be made to identify those specific research questions where it may be important to ensure the involvement of minorities in sufficient numbers to permit informative subgroup analyses.

The consistency of the evidence suggests that, historically, the empirical basis of our understanding of human behavior, its disorders and treatment, has largely excluded analysis of ethnic minorities. Since March 1994, NIH has required the inclusion of racial and ethnic minorities in research studies involving human subjects. Continued vigilance in implementing this requirement is expected to yield increased knowledge about racial/ethnic minority populations.

## **Conclusion**

The Workgroup developed a three-pronged rationale for increasing the number of racial and ethnic minority scientists. The first compelling reason is to help make up the projected shortfall associated with the aging of the largely White scientific workforce and the declining birthrate of Whites; failure to address these trends will jeopardize the Nation's most important scientific and technological enterprises. Second, more racial/ethnic minority mental health researchers are needed to address the health and mental health disparities that plague our Nation. Although scientists of any race/ethnicity can address this national priority, racial and ethnic minority investigators are particularly likely to possess the necessary motivation and persistence to study health disparities. Minority investigators will bring to the task insights into the distinctive needs and strengths of minority populations. In many cases, contributing to the welfare of their own communities serves as an important motivation for this line of inquiry. Third, increases in the number of racial/ethnic minority scientists will help to broaden the diversity of study populations and deepen our understanding of human behavior.

# Chapter III.

## **The Educational Context of Racial/Ethnic Minorities**

To more fully understand the recruitment mix of current and potential investigators, it is important to examine how racial and ethnic minority groups are represented throughout the educational system, from high school to university faculty positions. This chapter reviews national data on the status of minority faculty and students at key junctures in their career development. To interpret the data, the Workgroup used two reference points. In all cases, the representation of minorities within each stage of the pipeline was compared to their representation within the Nation's population. Given that racial/ethnic minorities are frequently underrepresented at later stages of the pipeline, it is important to apply a second reference point, specifically the ethnic group's representation in the pool from which the next educational stage draws. The former represents an aspirational goal, whereas the latter reflects an estimate of the available pool from which institutions select trainees. In addition, qualitative data obtained from the workshop participants are used to point out some of the barriers to successful careers for racial/ethnic minority investigators.

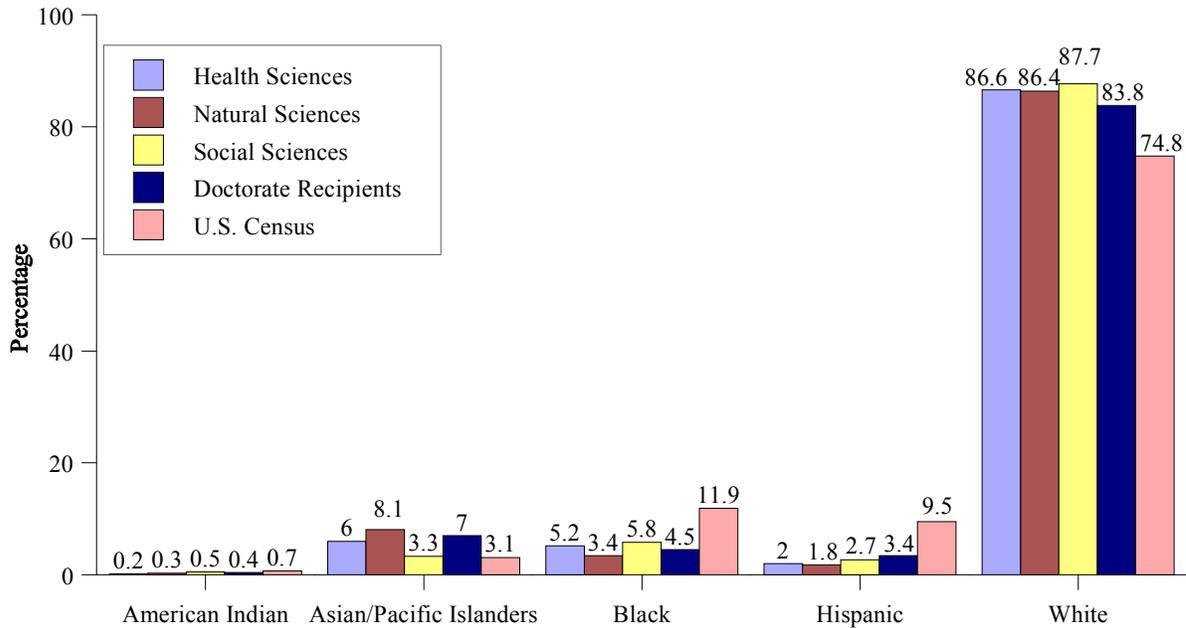
### **Faculty**

Figure III-A depicts the representation of ethnic/racial minorities among full-time faculty in 1992 within three science areas: health, natural,

and social sciences. Relative to their proportion within the national population, American Indians, Hispanics, and African Americans are significantly underrepresented. For instance, American Indians make up from .2% to .5% of 1992 faculty in the different sciences relevant to mental health (health, natural, and social sciences) and .7% of the U.S. population in the same year. The proportion of ethnic minority groups among faculty members is in general more favorable when compared to 1993 doctorate recipients than when compared to the U.S. census figures. For instance, the percentage of African American faculty in the health sciences (5.2%) and social sciences (5.8%) is greater than the proportion of doctorate recipients across disciplines in the 1993 survey (4.5%). Underrepresentation compared to doctoral recipients is still seen, however, in two of the science domains for American Indian and Asian/Pacific Islander faculty and the three science domains for Hispanics.

An analysis of 1997 faculty data across all disciplines (Figure III-B) indicates that assistant professor was the predominant rank for each minority group. Full professorships were predominant only for White faculty. It is noteworthy that assistant professors are likely to have more teaching and administrative responsibilities and, therefore, less time for research than full professors. These two factors suggest that the number of racial/ethnic minority investigators available to submit applications and mentor future scientists should increase as their representation among tenured faculty increases.

**Figure III-A.**  
 Percentage of Full-Time Faculty by Academic Discipline and Ethnicity  
 Compared to 1992 Census



Sources: The Chronicle of Higher Education Almanac, September 1, 2000, p. 38. National Academy of Sciences (1995). Summary Report 1993: Doctorate Recipients from United States Universities, Washington, DC. U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000.

## Students at Graduate/Professional Schools and Colleges/Universities

A pattern similar to that observed in faculty can be seen among students enrolled in graduate and professional schools. African Americans and Hispanics are particularly underrepresented relative to their proportion in the U.S. population. For instance, African Americans accounted for 7.5% of all students enrolled in graduate and professional schools while they represented 12.1% of the Nation's population. However, when considering the pool from which graduate and professional schools draw, that is, baccalaureate recipients, the picture of representation improves for both African American and Hispanic groups (e.g., 7.5% of African American baccalaureates are in graduate and professional school versus 7.8% of all college degree recipients). Asian/Pacific Islanders and American Indians are equally or near

equally represented when considering their proportion in the U.S. census or among baccalaureate recipients. For example, American Indians make up 0.6% of graduate and professional school students, 0.6% of baccalaureate recipients, and 0.7% of the U.S. population (see Figure III-C). Thus, among graduate and professional school students, the representation of American Indian and Asian/Pacific Islander students are at least consistent with their proportions among college degree recipients and within the U.S. population. On the other hand, African Americans and Hispanics are underrepresented when compared to their proportion in the U.S. census but much less so when considering their representation among recipients of the baccalaureate degree.

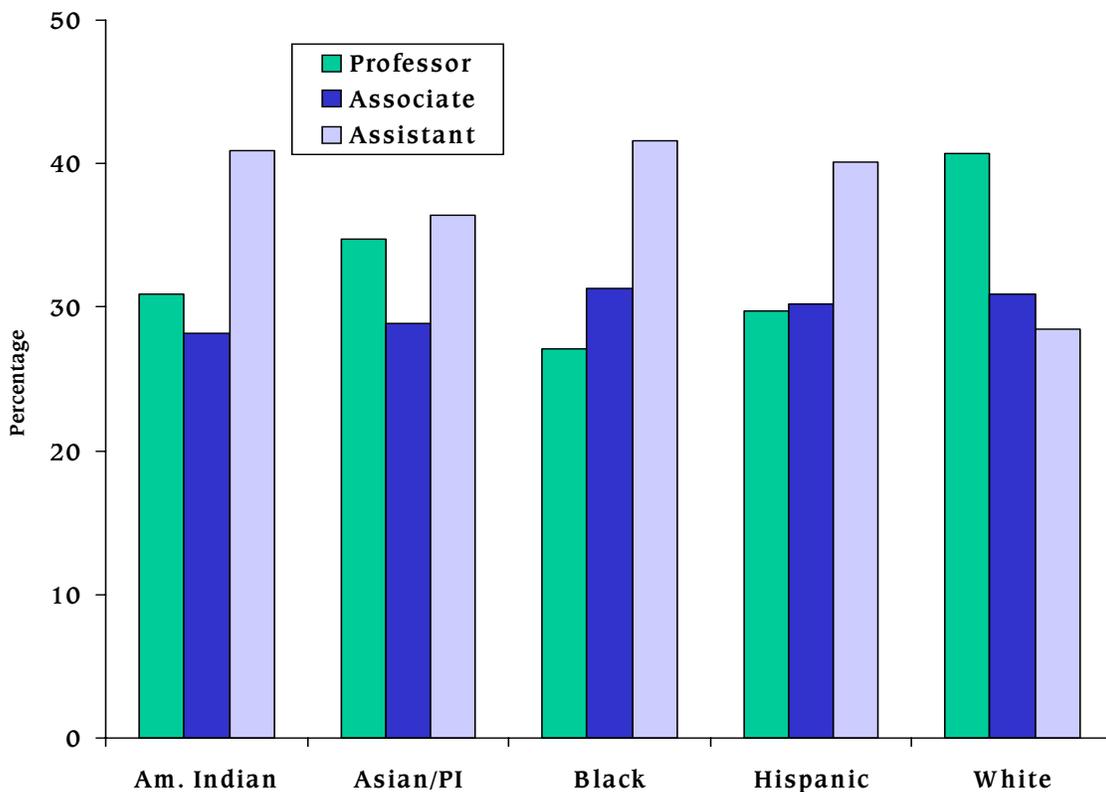
Examination of the student demographics for four-year colleges and universities granting baccalaureates with two-year community colleges

granting associate degrees indicates that the two-year colleges do a slightly better job in enrolling and graduating minority students, particularly American Indians, African Americans, and Hispanics (see Table III). For instance, the percentage of African American students in two-year colleges (enrolled, 11.5%; graduated, 9.2%) is greater than the percentage in four-year institutions (enrolled, 10.1%; graduated, 7.7%).

Although the overall percentages of underrepresented minority college students are beginning to resemble the national population profile, rates continue to lag at four-year institutions. Finally, the higher representation of

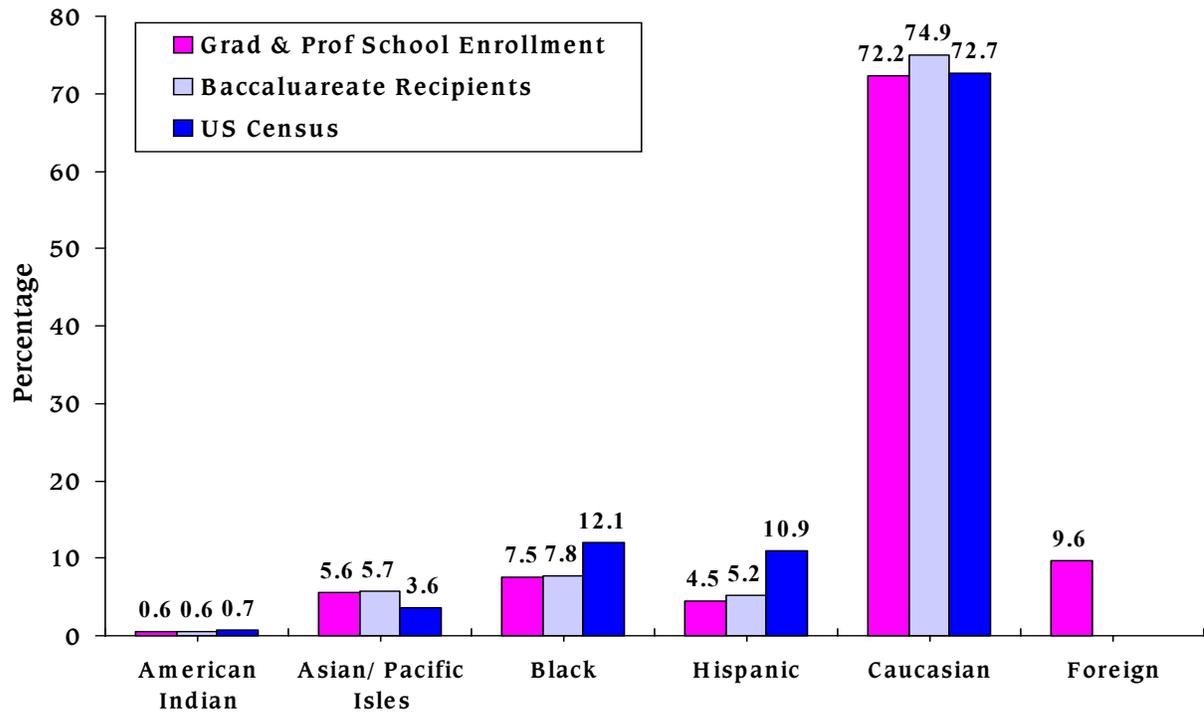
minority students in the community college system suggests that this education level may be a source of potential mental health scientists and a useful location in which to promote mental health research careers. Although the Workgroup does not recommend that NIMH conduct research training initiatives at the community college level, the Workgroup emphasizes the need on the part of faculty, the scientific community, and Federal agencies for more effective communication and outreach to two-year college students. These entities should encourage community college students to continue their education at colleges and universities where research training opportunities and resources are available.

**Figure III-B.**  
Within-Group Percentage of Nation's Full-Time Faculty by Rank and by Ethnicity, 1997



Source: U.S. Department of Education, National Center for Education Statistics (1997). Integrated Postsecondary Education Data System, Fall Staff Survey.

**Figure III-C.**  
 Minority Group Representation in Graduate and Professional School  
 Enrollment, Baccalaureate Recipients, and U.S. Census, 1997



Sources: U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000; The Chronicle of Higher Education Almanac, September 1, 2000, p. 24; and National Center for Education Statistics, Integrated Postsecondary Data System.

**Table III.**  
 Percentage of Enrollment in Four-Year and Two-year Colleges and Universities,  
 and Degrees Conferred by Ethnicity and Resident Status, 1995-1996  
 United States Citizens and Resident Aliens

	American Indian	Asian/Pacific Islanders	African American	Hispanic	White	Non-Resident Alien	Race Unknown
<b>Four-Year Enrollment</b>	0.8	5.7	10.1	5.8	77.6	—	—
<b>Degree Conferred</b>	0.6	5.4	7.7	4.9	75.9	3.2	2.4
<b>Two-Year Enrollment</b>	1.2	5.8	11.5	11.3	70.2		
<b>Degree Conferred</b>	1.0	4.1	9.2	6.7	75.1	1.8	2.1

## High School and Earlier

High school represents the final segment of the educational pipeline that the Workgroup considered. Census data (1999) on the educational attainment of adults 25 years and older show that Hispanics (56.1%) and African Americans (77.4%) graduate from high school (or earn a general equivalence diploma [GED]) at lower rates than the national average (83.4%) (Newburger & Curry, 2000). High school graduation rates for Whites and Asian/Pacific Islanders were 88% and 85%, respectively. Although American Indians/Alaska Natives were not included in the 1999 analyses, 1990 census data for adults ages 25 years and older found the high school graduation rate for American Indians to be 66% (The Chronicle of Higher Education, 2000).

Although there are exceptions, it is likely that for many students an interest in science emerges prior to completing high school and may have roots in the elementary school years. Clearly, appropriate and effective science education in the early years of schooling is very important if the Nation is to increase the numbers of students of all backgrounds who are interested in science and in science career fields.

## Barriers to Positive Educational Outcomes: Qualitative Data

The comments of trainees, junior and senior investigators, and training directors at the aforementioned NIMH-sponsored October 1999 workshop confirmed the quantitative evidence that the career pathways of minority researchers are likely to be interrupted at different stages. A combination of career obligations and life experiences can cause delays, departures, and subsequent returns to the career pathway. Obstacles to uninterrupted educational trajectories

for students include financial and academic problems, marriage, births, divorce, responsibility for aging parents, tenure requirements, family problems, and National Guard or Reserve activation for military service.

Workshop participants also cited as barriers the perceived effects of discrimination, which can lead to 1) limited access to mentors and the informal networks of communication at the more prestigious levels of science; 2) inadequate communication between minority research programs and university academic departments; 3) insufficient racial/ethnic minority role models who portray mental health science as a prestigious and profitable career field; and 4) inadequate basic science, mathematics, reading, and writing skills. Related to the educational deficits experienced by some students, limited English language skills were described as a barrier for some minority students who possess the aptitude but lack the exposure to fundamental concepts, constructs, and vocabulary that serve as the underpinnings of statistical computations, research methodology, and theoretical frameworks. Interventions to address the wide range of obstacles and barriers are necessary to prevent delays or departures from becoming permanent losses.

## Conclusion

The career path for racial/ethnic minority mental health researchers is wrought with significant points of attrition or “leaks in the pipeline.” The greatest attrition occurs prior to high school graduation. The fact that nearly half of Hispanic adults, a third of American Indian adults, and nearly a quarter of African American adults failed to complete high school is a major loss to the development of scientists. Available data suggest that losses continue at each subsequent transition point, including college graduation, graduate/professional school enrollment,

employment as faculty, and promotion within the faculty ranks.

It is encouraging that enrollments in community colleges are beginning to approximate the representation of American Indians, African Americans, and Hispanics in the United States. Addressing the educational barriers that minorities encounter at each level of the educational system is likely to retain more minorities in the pipeline.

# Chapter IV.

## **Progress in NIMH Support of Racial/Ethnic Minority Researchers and Trainees**

Given the value of minority investigators to the Nation's workforce and its health and scientific knowledge base, the Workgroup examined the role and effectiveness of the full array of mechanisms used by NIMH to support minority researchers and trainees. This section reviews available data on NIMH-supported independent investigators and their ethnicity, and on trainees now "in the pipeline." To provide a broader context, the report presents data on ethnic minorities in faculty positions, in graduate school, in college, and in high school—information and perspectives that help NIMH identify both progress it has made and areas that need additional attention to ensure NIMH achieves the best return on its investments. Similar to the examination of the educational context, two reference points will be used to interpret how well minority trainees and investigators fare within NIMH. Minority representation within the different NIMH programs will be contrasted to (a) the specific group's national representation and (b) their representation in the specific applicant pool under review (e.g., faculty and doctorate recipients). Whereas national census figures may reflect a major goal of any program striving to increase diversity, figures from the specific applicant pool reflect the educational context in which NIMH works to recruit and engage minority trainees and investigators.

## **NIMH Investigator-Initiated Applications and Awards by Race/Ethnicity**

NIH supplied available data regarding minority investigators' success with competing research project applications. These data aggregate all Research Project Grant (RPG) mechanisms for 1999, from the small grant (e.g., R03) to the senior investigator awards (e.g., R01). Multi-site projects and cooperative agreements also are included.

Table IV-A presents the data organized by race/ethnicity and representation among the number of grant applications submitted to NIMH, the number of applications funded, and the specific ethnic group's success rate. "Success rate" is defined as the number of applications funded divided by the number of applications submitted. Few applications were submitted by American Indians, African Americans, and Hispanics, and fewer grants were awarded to investigators in these respective racial/ethnic minority groups. The corresponding proportions of funded applications from these ethnic groups are considerably less than their representation in the 1999 census (American Indians, 0.2% versus 0.7%; African Americans, 1.0% versus 12.1%; and Hispanics, 2.7% versus 11.5%). A somewhat different picture is identified when comparing minority representation among grant recipients with that of postsecondary education faculty at the assistant professor, associate professor, and professor levels in 1997 (the most recent data available). Underrepresentation is still

**Table IV-A.**  
 Number and Percentage of NIMH Applications for  
 Competing Research Projects Submitted and Awarded by Race/Ethnicity, 1999

<b>Ethnicity</b>	<b>Number Submitted</b>	<b>Percentage of Applications Submitted</b>	<b>Number Awarded</b>	<b>Percentage Awarded</b>	<b>Within-Group Success Rate</b>
American Indian	3	0.2	1	0.2	.33
Asian/ Pacific Islander	97	5.3	27	5.5	.28
Black	31	1.7	5	1.0	.16
Hispanic	61	3.3	13	2.7	.21
White	1483	80.7	414	84.5	.28
Unknown	162	8.8	30	6.1	.19
<b>Total</b>	<b>1837</b>	<b>100%</b>	<b>490</b>	<b>100%</b>	<b>.27</b>

Source: NIH

**Table IV-B.**  
 Number and Percentage of NIH Applications for Competing Research Projects  
 Submitted and Awarded by Race/Ethnicity, 1999

<b>Ethnicity</b>	<b>Number Submitted</b>	<b>Percentage of Applications Submitted</b>	<b>Number Awarded</b>	<b>Percentage Awarded</b>	<b>Within-Group Success Rate</b>
American Indian	34	0.1	11	0.1	.32
Asian/Pacific Islander	3164	12.0	890	10.4	.28
Black	338	1.3	63	0.7	.19
Hispanic	626	2.4	195	2.3	.31
White	20267	76.7	6880	80.4	.34
Unknown	1980	7.5	518	6.1	.26
<b>Total</b>	<b>26409</b>	<b>100%</b>	<b>8557</b>	<b>100%</b>	<b>.32</b>

Source: NIH

evidenced among African Americans (1.0% versus 4.6%) but no longer observed among American Indians (2.0% versus 0.3%) and Hispanics (2.7% versus 2.3%). Also, within-group success rates for African American (16%) and Hispanic (21%) applicants fell below NIMH's overall funding rate of 27%. One of the three applications submitted by American Indian investigators was funded, accounting for a relatively high success rate (33%). The low number of investigator-initiated applications and the lower-than-average success rates leads to the comparatively small number of approved grants, especially to African American and Hispanic researchers.

Asian/Pacific Islanders' representation among applications funded (5.5%) was higher than their proportion in the U.S. population in 1999 (3.7%) but slightly lower than their representation among faculty in 1997 (5.9%). The success rate of applications from Asian/Pacific Islander investigators was identical to that of Whites (28%). The proportion of funded applications that went to White investigators (84.5%) was above their representation in the population (71.9%) and nearly identical to their representation among the noted faculty ranks (84.9%).

It is informative to compare these NIMH trends with the experiences of racial/ethnic minority investigators across the NIH (Table IV-B). Both similarities and differences are evident. One similarity is that the percentage of total applications submitted and funded from American Indian, African American, and Hispanic investigators is low for NIH as well as for NIMH. Among the main racial/ethnic groups, African Americans have the lowest success rate for both NIMH (.16) and NIH (.19). Another similarity between NIMH and NIH is that the percentage of applications submitted by and awarded to White investigators is above their representation in the 1999 U.S. population.

There are important NIMH-NIH differences as well. With regard to applications from American Indians, African Americans, and Hispanics combined, NIMH received a greater proportion (5.2%) than did NIH overall (3.8%). This differential also occurs among applications that are awarded: The percentage of NIMH-funded investigators from these three minority groups (3.9%) slightly exceeds the comparable NIH-wide figure (3.1%). NIMH both attracts and funds a greater proportion of research applications from minority investigators than does NIH. In both settings, however, the percentages are still significantly lower than the groups' representation in the Nation's population and to a much lesser degree than the groups' representation among the Nation's faculty.

One important qualifying feature of NIMH's apparently better record is that the success rate of applicants from these three minority groups is lower at NIMH (20%) than at NIH (27%). In other words, although the proportion of submitted and funded applications from minority researchers is greater at NIMH, applicants from these minority backgrounds are less likely to be funded than are those applicants to all of NIH. One possible explanation for this seemingly contradictory finding is that NIMH overall has a lower success rate (27%) than does NIH (32%). Another NIMH-NIH difference is that Asian/Pacific Islanders fare better at NIH than at NIMH with respect to submitted applications (NIH, 12%; NIMH, 5.3%) and for funded applications (NIH, 10.4%; NIMH, 5.5%).

One limitation of these data is that NIH does not require applicants to report their ethnicity. With each application, principal investigators (PIs)/program directors are asked to submit a voluntary self-report of their race/ethnicity, although a substantial number of PIs decline to do so. Of the 1,837 applications for competing research projects at NIMH in 1999, 328 (17.9%) did not indicate the PIs ethnicity. Among funded

applicants, 8.6% did not report ethnicity. The number of applications for which the investigator's ethnicity is unknown (N = 42) is nearly identical to the number of applications in which PIs identified themselves as racial/ethnic minorities (N = 43 or 8.8%). Because the proportion of minority scholars is small, any increase in their numbers significantly affects the representation of ethnic minority investigators among NIMH grantees. The NIH drew from other databases (e.g., earned doctorate files) in an effort to fill in the picture. For 1999, this search reduced the number of PIs with unknown ethnicity from 42 to 30. The additional information regarding ethnicity is useful, but it remains important to recognize the limitations of these data.

A second limitation is that the unit of analysis was number of applications rather than number of applicants. Submission of multiple grants by an individual could alter proportions, and the effect would be particularly noticeable for ethnic minority investigators. A third limitation is that available data describe only one year and may not be representative of previous years. While such limitations require caution in interpreting the results of the analysis, the potential benefits of shedding light on NIMH's review and funding processes outweigh the potential risks in reporting limited data. As noted in a section that follows, consistencies among these data regarding the racial/ethnic sources of investigator-initiated grants and comparable career development and trainee data as well as for NIMH and overall NIH patterns argue for their inclusion in this report.

Limitations of the available data notwithstanding, they consistently point out the paucity of racial/ethnic minorities among NIMH-funded research projects relative to their representation in our Nation as a whole. However, when compared to the proportion of minorities among college and university faculty, only African Americans are significantly underrepresented among grant applicants.

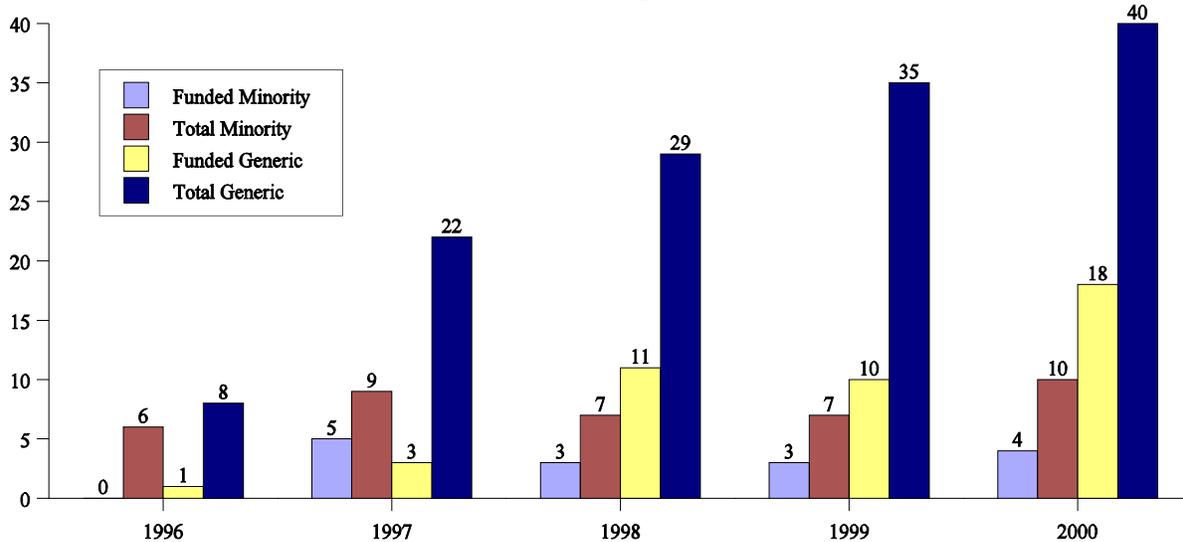
## **Research Training and Career Development Funding Mechanisms**

Ethnicity data are available for grants targeted to ethnic minority investigators and trainees. These include the New Minority Faculty K01 awards, the Minority Supplements, and Underrepresented Minority Fellowship Programs (T32s). Together with this information from institutional training grants (T32s), these data provide some evidence of NIMH's record in supporting minorities in career development and training. Missing has been information on the ethnicity of those who received the individual non-minority (i.e., generic) career development (K01, K08, K23) and individual fellowship awards (F30, F31, F32). The available data cover the more advanced trainees (Scientist Development Awards for New Minority Faculty) to the least advanced trainees (high school students).

The Mentored Scientist Development Award for New Minority Faculty (K01) parallels the Mentored Research Scientist Development Award (generic K01) that is available to both minority and non-minority investigators. Both grant mechanisms were initiated in 1996 to assist new faculty members develop research programs. As seen in Figure IV-A, the number of New Minority Faculty K01-funded applications in a given year has ranged from 0 to 5, in contrast to 1 to 18 funded applications for the Scientist Development Awards (K01s). For both awards there is a corresponding greater number of applications each year for the generic award than for the minority award.

In calendar year 2000, for example, there were 40 applicants for the generic Scientist Development K01 and 10 applications for the New Minority Faculty K01. The success rate for the generic award is 32% and for the minority grant is 38%. The NIMH is urged to work more vigorously to encourage minorities to submit applications for these award mechanisms. NIMH does not know

**Figure IV-A.**  
 Number of NIMH Funded and Total Applications for New Minority Scientist Awards  
 and Generic New Investigator Awards by Year



Source: NIMH

the race/ethnicity of the recipients of the minority and non-minority grants because Federal privacy laws limit the collection and use of such information and it is difficult to access these data from NIH. Information about recipients' race/ethnicity clearly is important for evaluation purposes. Such data will enable NIMH to determine whether a minority-focused mechanism increases the production of minority investigators above and beyond the generic mechanism.

The intent of the Minority Supplement is to encourage PIs to mentor trainees and investigators so that they later become independent investigators. A Supplement is granted to investigators who have at least two years remaining on a major NIH-funded research project. The PI applies for the grant to support a minority investigator or trainee who will work on research related to the major research project. This section provides data from 1998/99 to assess the success of this mechanism at the NIMH. Particular attention is given to post-doctoral and investigator-level recipients as they are more advanced in their

career development and more prepared to submit a research application within a short period of time after receiving the Supplement award.

In FYs 1998 and 1999 the NIMH awarded 113 and 110 Minority Supplements totaling \$5.4 million and \$5.8 million, respectively. Over 50% of the awards were made for post-doctoral trainees and investigators (1998, 50.4%; 1999, 58.2%). In FY 1998, the pattern of distribution of Minority Supplements was investigators, 17.7%; post-doctoral, 32.7%; pre-doctoral, 41.6%; and college, 8.0%.

The distribution was similar the following year: investigators, 18.2%; post-doctoral, 40%; pre-doctoral, 35.5%; and college, 6.4%. Although high school students are eligible, none were awarded supplements in 1998 or 1999. NIMH is the leading NIH Institute in its use of minority supplements. In 1998 and 1999, NIMH devoted the largest percentage of its eligible research grants to Minority Supplements: 1.08% and 1.01%, respectively (Table IV-C).

**Table IV-C.**  
Expenditures for Minority Supplements as a Percentage of Eligible  
Research Grants by Institute (1998-99)

<b>INSTITUTE</b>	<b>Percentage in 1998</b>	<b>Percentage in 1999</b>	<b>Mean Rank Order 1998-99</b>
National Institute of Mental Health	1.08	1.01	1
National Institute of Nursing Research	0.76	0.67	3
National Institute on Aging	0.76	0.66	3
National Institute of Dental and Craniofacial Research	0.97	0.62	3.5
National Institute on Drug Abuse	0.73	0.65	4.5
National Heart, Lung and Blood Institute	0.63	0.59	7
National Institute of General Medical Sciences	0.63	0.53	7
National Institute of Diabetes & Digestive and Kidney Diseases	0.66	0.48	7
National Institute of Arthritis & Musculoskeletal & Skin Diseases	0.46	0.39	11
National Institute of Child Health and Human Development	0.47	0.36	11.5
National Institute on Deafness & Other Communication Disorders	0.54	0.32	12
National Institute of Allergy and Infectious Diseases	0.38	0.37	12
National Institute of Neurological Disorders and Stroke	0.34	0.46	12.5
National Institute of Alcohol Abuse and Alcoholism	0.22	0.47	13
National Eye Institute	0.38	0.31	14.5
National Cancer Institute	0.27	0.32	15
National Institute of Environmental Health Sciences	0.36	0.24	16
National Human Genome Research Institute	0.17	0.28	17.5

Source: NIH

Note: The 1998 data for Asian/Pacific Islanders were not reported.

The representation of the four major ethnic groups among awardees of Minority Supplements from 1995 to 1998 is generally consistent with these groups' distribution among the four main racial/ethnic groups (see Figure IV-B). The reference point used in this report is the percentage of each minority group within the overall proportion of minorities for 1997.

Although NIMH receives high marks in its use and distribution of the Minority Supplement relative to its sister institutes, the more important outcome is the number of Supplement recipients who go on to become independent investigators supported by NIMH or another NIH Institute. The Workgroup identified Supplement recipients for the period January 1997 through December 19, 2000, and examined NIMH and NIH databases to determine if recipients (a) ever submitted a grant application, (b) were awarded any type of grant, and (c) were awarded an independent investigator award (R01). Given the relatively short period of time during which the supplement has been available, it is unreasonable to expect many undergraduate or graduate students to have submitted research grant proposals. Therefore, the analysis focused only on post-doctoral and investigator recipients. Figure IV-C summarizes the main findings.

A total of 82 supplements were awarded to post-doctoral and investigator-level researchers during this period. A similar number (83) was awarded to undergraduate and pre-doctoral trainees. Of the 82 advanced recipients, 30 (37%) submitted grant proposals and 11 applicants were successful. Four persons submitted R01 applications. One investigator was successful on the first try, and one investigator is awaiting the outcome of the review/funding process. The other successful grantees obtained R03, R21, R29, and training and career development awards (F32, K01, K23).

One possible explanation for the small number of applicants is that those who receive Minority Supplements from NIMH may obtain subsequent

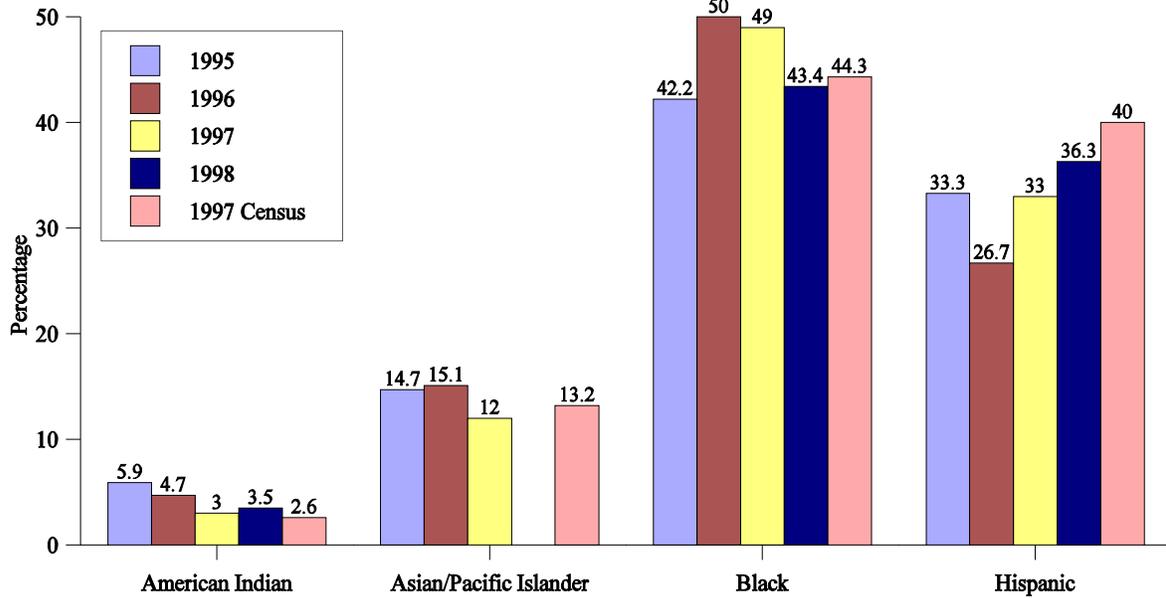
research support from other NIH Institutes. Indeed, an examination of the entire NIH database indicated that 11 of the post-doctoral or investigator-level recipients submitted applications to other NIH Institutes. Of those, six had also submitted an application to NIMH, thus resulting in five new applicants. Five of the 11 applicants were successful in obtaining support for their research (R01 and R21) or training/career development projects (K14 and two F31s). Another investigator submitted an R01 application and is awaiting the review/funding decision. When considering data from both NIMH and other NIH Institutes, 43% (35 of 82) of Minority Supplement recipients have submitted applications, 20% (16 of 82) have been funded, 7% (6 of 82) have submitted R01 applications, and 2% (2 of 82) were awarded R01s.

NIMH invests substantially in the Minority Supplement mechanism and, except for Hispanics, the four main racial/ethnic groups are well represented among the recipients. Still, the outcome data are mixed. On the one hand, over two-fifths apply to NIH for subsequent research funding and one-fifth are funded. On the other hand, few minority investigators have submitted R01 applications and only two have been successful. It is clear that more must be done to increase the number of supplement recipients who submit their own successful research applications.

### ***INSTITUTIONAL (National Research Service Awards [NRSA]) TRAINING GRANTS (T32s).***

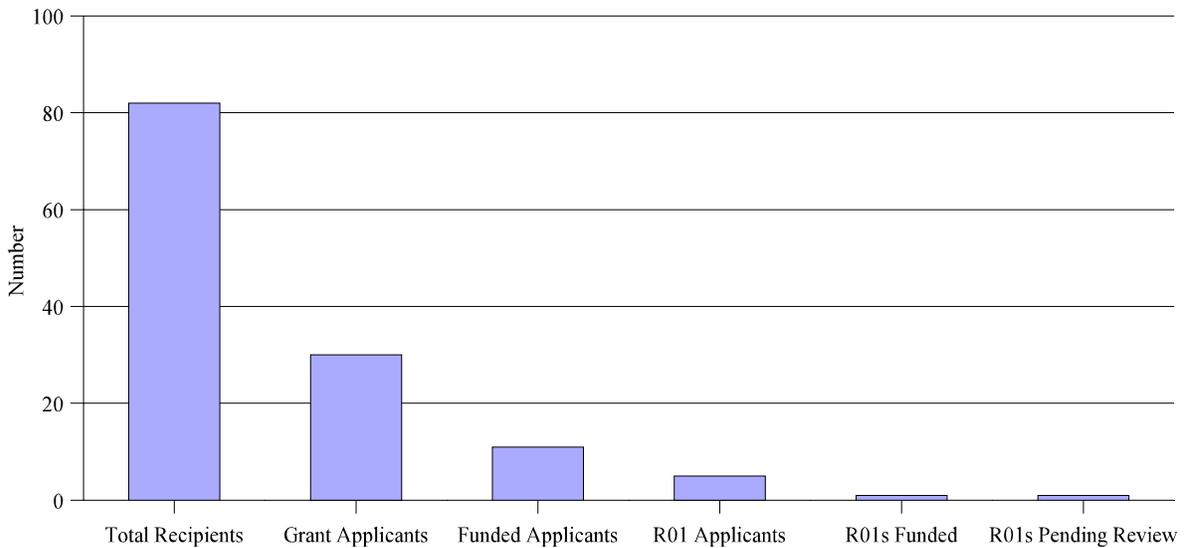
Another funding mechanism widely used to support minority research training is the institutional training grant (T32) for pre- and post-doctoral level trainees. NIMH funds two types of such programs, University-Based Programs (UBPs) and a smaller category of national programs administered by four professional associations that specifically recruit trainees from minority groups, referred to as the

**Figure IV-B.**  
 Percentage of Minority Supplements Awarded 1995-1998 by  
 Ethnic Group Compared to 1997 U.S. Census\*



\*The census data represent the proportion of each racial/ethnic group among the four minority groups combined.  
 Sources: NIMH and U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000.  
 Note: The 1998 data for Asian/Pacific Islanders were not reported.

**Figure IV-C.**  
 Outcomes of NIMH Minority Supplement Recipients:  
 Investigator and Post-Doctoral Levels 1997-2000



Sources: NIH

Underrepresented Minority Fellowship Programs (UMFPs).

The UBPs train students from all ethnic backgrounds, and together they support a large number of trainees (e.g., N = 844 in 1998 of which 136 were from underrepresented minority groups). The professional association-based UMFPs are much smaller (e.g., N = 98 trainees in 1998). These are administered by the American Psychiatric Association, the American Psychological Association, the American Sociological Association, the Council on Social Work Education, and the Society for Neuroscience. The American Psychological Association administers two separate programs, a generic psychology research training program and a neuroscience training program.

The race/ethnicity of the trainees was examined by the type of program (UBP or UMFP) separately and combined. The separate analysis identifies how well each program type is doing in recruiting minorities from diverse backgrounds whereas the combined analysis indicates how effectively NIMH is supporting minority trainees overall. Figure IV-D depicts minority representation within UBPs only and within UBPs and UMFPs combined. U.S. census data from 1997, the same year from which the training data were obtained, are included to show the extent to which trainees at this level reflect the ethnic diversity of the United States. In the UBPs, American Indian and White trainees approximately mirrored their proportional presence in the overall population, while Asian/Pacific Islander trainees represented nearly twice their proportion in the U.S. population (7.0% versus 3.6%). The two largest racial/ethnic minority

groups, African Americans and Hispanics, however, were underrepresented. African Americans and Hispanics made up only 4.7% and 3.6% of UBP trainees whereas they were 12.1% and 10.9% of the 1997 U.S. population. Thus, the

UBPs fall considerably short in training African American and Hispanic pre-doctoral students if the reference point is the U.S. census. Combined analysis of the UMFPs and UBPs yields a significantly different ethnic distribution of trainees. When combined, UBP and UMFP numbers total 24% of minority trainees on T32s, in comparison to their census representation of 25%. The most striking change is observed with respect to African Americans, whose percentage more than doubled, from 4.7% to 10.6%, approaching their proportion within the United States (12.1%). Hispanics' representation among trainees also increased, although to a lesser degree. The percentage of Whites fell below their representation within the U.S. population in the combined analysis. Even when the UMFPs are tallied, a shortfall remains in representation of minority pre-doctoral students, particularly among African American and Hispanic trainees. (Data for pre-doctoral training programs that contained or excluded UMFP data were less than 100%, because 10.9% and 10% of the trainees for each data set chose not to report their ethnicity.)

It is clear that the UMFPs contribute significantly to the training of racial/ethnic minorities. A closer examination of these programs is possible because the administrative organizations (e.g., American Psychological Association, Council on Social Work Education) collect detailed information regarding their trainees. Most importantly, graduates of these programs primarily go on to academic/teaching positions in the following specialties: neurosciences, 50%; psychiatry, 79%; psychology, 50%; social work, 66%; and sociology, 71%. Smaller proportions, ranging up to 15% of trainees for a given discipline, obtain research-only positions (NIMH, Interim Staff Report, 2000; <http://www.nimh.nih.gov/council/minority.pdf>).

Acquiring academic, teaching, or research positions oftentimes facilitates the development of independent investigators, as most persons with

such positions are required to develop their scholarly activities. The UMFPs do an excellent job of recruiting African Americans who, in 1998, were nearly two-thirds of UMFP trainees. In contrast, Hispanics were underrepresented relative to their census representation among the four main racial/ethnic groups, and American Indians and Asian/Pacific Islanders approached their relative proportion among minority groups. While the combined data of the UBPs and UMFPs point to a shortfall in the number of NIMH-supported minority trainees relative to the respective groups' 1997 census levels, the picture improves if the reference point used is the available applicant pool, namely, baccalaureate recipients. Recent data (1997) suggest that all groups more closely approximated their representation among baccalaureate recipients. For example, Hispanics' representation within UBPs and UMFPs (5.5%) is low compared to the representation of Hispanics in the Nation (10.9%) but higher than their representation among college degree recipients (5.2%). The 1997 census data were used to coincide with the most recent available data on baccalaureate recipients (Figure IV-D). The Workgroup believes that as the size of the racial/ethnic minority baccalaureate recipient pool—and, thus, the UBP and UMFP applicant pool—increases, the number of racial/ethnic minority trainees will also increase.

However, underrepresentation of African Americans and Hispanics persists. The representation of Asian/Pacific Islanders and American Indians is consistent with their representation in the Nation. Given the importance of the T32 training for generating a pool of potential scientists, it is important that the data from other years be examined carefully.

### ***INDIVIDUAL MINORITY FELLOWSHIP AWARDS (F31).***

Another means of supporting pre-doctoral investigators is the individual pre-doctoral fellowship award. There is an F31 generic grant and an F31 grant for ethnic minority applicants. The minority fellowship was first announced in 1995 (PA 95-029, revised PA 00-069), whereas the generic grants have been in existence for a longer period of time. At this time, data for the minority F31 indicates that from 1995 to 1998 no applications were submitted to NIMH. In 1999, one of two submissions was funded; in 2000, three of four applications were awarded, and one was pending as this report was in final preparation. The low number of applications in response to the minority F31 may be due to applicants applying for the generic mechanism, not knowing about the alternative F31 or not wanting to be identified as an awardee of a minority mechanism.

### ***MINORITY DISSERTATION RESEARCH AWARDS (R03).***

The last pre-doctoral mechanism that the Workgroup analyzed was the Minority Dissertation Research Award. This was established in 1994 (PA 94-053) and updated in 1999 (PA 99-139). On average, slightly more than three awards have been funded annually since 1995. The ratio of applications to awards for the six-year period is as follows: 1995, 2:2; 1996, 15:4; 1997, 14:4; 1998, 11:2; 1999, 0:0; 2000, 10:4. In the first six months of FY 2001, 12 applications have already been received. In contrast to the individual pre-doctoral fellowship (F31), a consistent number of applications are being submitted each year for this mechanism, with the exception of 1999, when for no clear reason, no applications were received. The racial/ethnic identity of these awardees is not known at this time.

### **CAREER OPPORTUNITIES IN RESEARCH (COR) HONORS UNDERGRADUATE RESEARCH TRAINING (T34) GRANT.**

The COR Honors Undergraduate Training Program began in 1979. Institutions with substantial racial/ethnic minority enrollments can apply for these awards.

One objective of the program is to increase the number of well-prepared minority undergraduate students who can compete successfully for entry into doctoral-level mental health research training programs. A second objective is to develop and strengthen mental health related curricula and research training opportunities at these institutions.

Data from program directors of all 15 funded programs as of October 1999 indicate that a total of 895 trainees have completed training and 540 (60%) have completed graduate school (including master's degrees).

The undergraduate COR programs recruit junior and senior majors in psychology, biology, chemistry, sociology, and social work, along with a few students in anthropology and education. The students must maintain a 3.0 or better grade point average on a 4.0 scale. Each program has a special COR curriculum with 20+ hours of required coursework in addition to the regular required courses for the college program degree. The students conduct research projects under supervision of faculty mentors and present oral and poster presentations at scientific meetings. They also participate in summer research internships and special enrichment activities that are sometimes conducted at other institutions. Academic and career counseling sessions are constants throughout the course of the program.

Data on all trainees beyond the baccalaureate degree are not complete. However, available data for 11 of the 15 COR undergraduate programs were analyzed for outcomes. The 11 programs

have been available for 4 to 20 years, with 10 having been in operation more than 10 years.

The undergraduate COR programs data, although incomplete, show the number of students entered and graduated from the 11 programs in terms of 1) the number known to have entered and/or completed advanced degree programs, 2) the types of advanced degrees they earned, and 3) the number currently in graduate or medical school.

The data indicate that an average of five trainees entered per year and five completed each program. An average of 85% (719/844) of trainees who entered the 11 programs graduated (range, 69%-100%) as of October 1999. Of 719 graduates, 290 are known to have obtained specific advanced degrees: 39% (N = 113/719) received a Ph.D., 14% (N = 42/719) received an M.D., and 41% (N = 120/719) received a master's. The remaining 5% (N = 15/719) received miscellaneous professional degrees (D.D.S., J.D., D.S.W.).

In general, NIMH's success in enrolling and graduating COR baccalaureate degree students is impressive. The available statistics that indicate the number of minority students that go on to pursue advanced degrees is likewise encouraging, even in the absence of complete data. For instance, three programs reported a large proportion of graduates (71%, 81%, and 96%, respectively) that were accepted into graduate school, but their final dispositions are not known.

### **HIGH SCHOOL HONORS COR (R25) PROGRAM CHARACTERISTICS.**

The high school component of COR provides an opportunity for institutions funded for an undergraduate training grant to offer mentoring and role modeling of up to six racial/ethnic minority high school students per year. The high school students interact with undergraduate COR

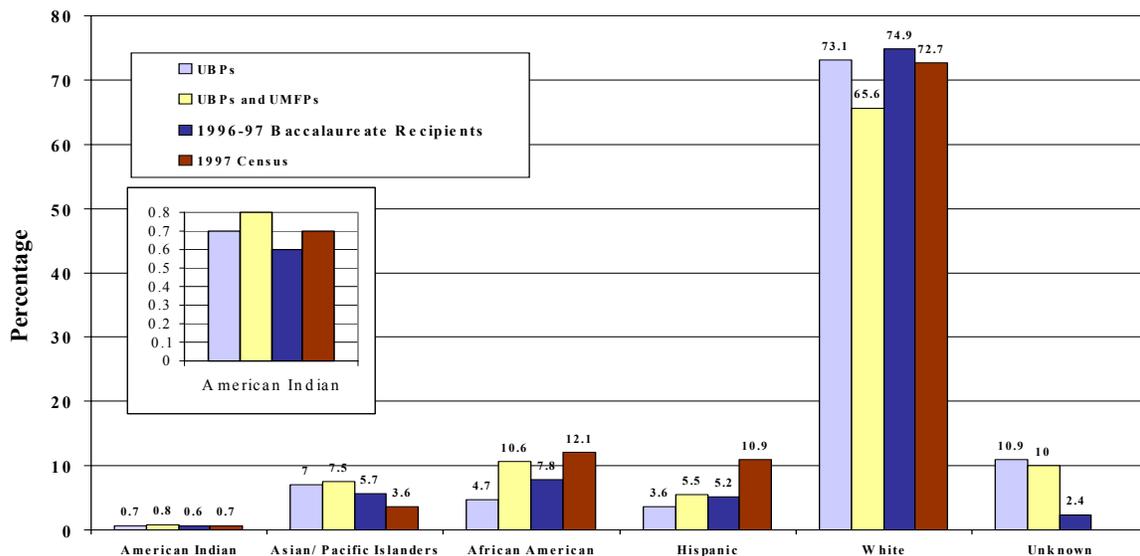
students and faculty of institutions that have COR Honors Undergraduate Training Grants.

The High School Honors COR Program began in 1994, and by October 1999, 72 students had completed the seven programs. Program directors report that all of the 72 students had entered college with 12 (17%) already graduated and the remainder still in college. Subsequently, the seven high school COR programs reported 88 students entering and completing college, with 99% enrolled in college and 87% graduated. Those who had not yet graduated were still in college. Though these findings are impressive, the Workgroup notes that it believes a more thorough and informative program analysis could be conducted with the implementation of a student tracking system.

## Conclusion

Although there is much room for improvement, the available data reveal a growing, diverse cadre of trainees and investigators who have received support from NIMH for either research training or career development. However, minority investigators are poorly represented among investigators approved R01 research grant applicants. A plausible explanation for the discrepancy is that minority investigators are having a difficult time making the transition from trainee to independent investigator. While resolving this discrepancy may be a function of time—that is, within 5 to 10 years, there may be a substantial increase in the number of research applications submitted by and funded to minority investigators—the Nation can ill afford to wait to see if time resolves the problem. Initiatives are needed both to strengthen the mentoring of future and current investigators and to build on existing training, career development, and research mechanisms.

**Figure IV-D.**  
Predoctorial Trainees by Ethnicity vs. 1996-97 Baccalaureate Recipients and 1997 U.S. Census by Ethnicity



Sources: NIMH; U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000; National Center for Education Statistics, Integrated Postsecondary Education Data System, Consolidated Survey.

# Chapter V.

## **Mentoring and Model Programs**

Despite the number of initiatives to support minority trainees and investigators, the number of funded applications from minority investigators is very small. In considering both qualitative and quantitative data, the Workgroup concluded that improved mentoring is needed to translate the gains at the earlier level of training into gains in fundable grants or faculty positions. Providing funds for training is not sufficient. It is critical to enhance the mentoring associated with training, with Minority Supplements, and with other training endeavors.

## **Mentoring and Tracking**

Mentorship is defined as assisting novices to become experts by helping them navigate personal and professional obstacles, develop professional relationships, and learn the subtle aspects of the work environment (Bowman et al., 1999). With the aim of developing clear recommendations regarding mentoring, the Workgroup identified model programs that focus on establishing strong mentoring relationships with trainees.

An important point raised at the Workshop was that mentors help students to translate their aspirations and expectations into tangible results and to see that there are opportunities that can be achieved. Oftentimes students, especially those that are younger, have unrealistic expectations about what it takes to become a scientist. A young scientist might anticipate for example, conducting research to cure a disease, frequently a disease

such as AIDS, diabetes, or cardiovascular disease that is prevalent in their community. When a student has not foreseen the rigors and course of scientific training, he or she may feel frustrated when, instead of working on the disease, they are compelled to understand the basics of science and mathematics. Workshop panelists noted that students' early ambitions should be channeled and addressed in a step-wise fashion so that students can understand that to achieve their goals they must first become competent in the basics of science. At the same time, the panelists cautioned that students' aspirations should not be dampened or discouraged; rather, they should be nurtured over the course of a process that takes considerable time.

The interest among underrepresented minority trainees in solving health problems in their communities is a good starting point from which to build. Mentoring these young people is critical for success in attracting them into and retaining them in research careers. In 1997, the National Academy Press published an excellent guide to mentoring titled "Advisor, Teacher, Role Model and Friend—On Being a Mentor to Students in Science and Engineering." The complete volume can be found at <http://bob.nap.edu/readingroom/books/mentor/>.

Mentors not only help students learn the importance of basic science or of developing the trainees' interests in researchable questions, but they also work closely with trainees to help them acquire the specific skills necessary to carry out research. Close one-to-one training is necessary, during which careful reviews are provided of laboratory techniques, statistical analysis, writing

of manuscripts and grant proposals, and rehearsals of research presentations. Moreover, this very specific technical skill training is provided in a supportive relationship.

## Model Programs

Two model NIMH-funded programs have successfully incorporated mentorship. Both used, in part, the Mental Health Education Grant (R25), a highly flexible mechanism that lends itself to variable activities that foster good student/mentor relationships. The R25 can be used by itself or in combination with other training and/or research grant mechanisms (T32/R01). Characteristics of the R25 mechanism (under revision) are:

- It supports “short courses” (research experiences/workshops/seminars)
- The total direct cost is up to \$150,000 per year
- Awards can be for up to five years
- Institutional commitments of support are encouraged but not required
- No stipends are provided, but support can defray participation costs
- Evaluation plans are required

## Conclusion

Mentoring is essential to the development of successful investigators. Mentorship can take place within a single one-to-one training relationship or within a given program with multiple mentors and apprentices. The sample programs illustrate that solid mentorship of minority investigators can lead to successful training outcomes. Clearly, further efforts of this kind are needed, not only in

### Box V-A: Model Program I

The Family Research Consortium (currently FRC III, following FRC I and II), led by Dr. Linda Burton at Pennsylvania State University, is featured as a model consortium/post-doctoral training program in the National Academy of Sciences report “Bridging Disciplines in the Brain, Behavioral and Clinical Sciences.” The FRC was organized to promote intellectual exchange and collaborative research and training on 1) theoretical approaches that are culturally and contextually relevant to the study of mental health and families in diverse populations, 2) new advances in research designs measurement and statistical methodology that need to be incorporated in research on diversity, and 3) the extension of basic studies on diverse families and mental health to prevention and intervention research. The consortium, funded as an R01 grant, meets four times per year to discuss collaborative research for advancing the understanding of cultural diversity as it relates to child and family mental health and disorders. One of the meetings is open to the field to ensure dissemination and integration with the wider research community. The members of the Consortium serve as faculty on an NIMH-funded post-doctoral training grant (T32). Trainees work with one primary and at least one secondary mentor. Early in training, each trainee participates in an eight-week course on child and family research. This is followed by close mentorship with the primary mentor for the remainder of the training experience. The consortium holds a summer institute each year on a different topic and invites approximately 100 other researchers to attend. Many young scholars attend for additional training and mentoring. One scholar has received a \$2.5 million grant and another a \$3.5 million grant from NIMH. As of FY 2000, roughly 90% of the post-doctoral scholars from FRC III are in their second year of training, and all have written grant applications as of October 2000. The new cohort of post-doctoral scholars for FRC III are highly diverse in terms of ethnicity: two African Americans, two Hispanics, one Asian/Pacific Islander, and two Whites.

innovative training programs but in conventional training programs as well. Mentoring programs should be designed to facilitate personal and professional networks. This will assist trainees in becoming associated with other researchers and

influential people who can help advise and guide them as they navigate their research/professional career pathways.

Though the analysis of the training data in this report reflects a positive academic progression for the majority of the trainees, further analysis of the talent pool is not possible due to the absence of standardized information about trainee performance and post-graduate activity. This type of information would be readily available in a centralized trainee tracking system, which this Workgroup recommends for implementation. A trainee tracking system provides early identification of education transition points and issues that influence attrition, stimulate specialty selection, and contribute to trainee advancement to the next level of career progression. The trainee tracking system would also indicate which funding mechanisms are successful and which need revision or elimination. Trainee tracking would contribute to a more thorough analysis of the NIMH research portfolio and return on investment of its training dollars. Once implemented, the trainee tracking system will assist in defining “success” for the racial/ethnic minority trainee, as well as contributing to the development of a “Mental Health Research Career Life-Cycle Model.” During the preparation of this report, the Workgroup noted that trainees, training program managers, and NIMH staff used different definitions for “trainee success.” For some trainees, success meant being the first family member to graduate from college. However, for training program managers, “success” was defined as those trainees who either pursued a research career, entered academia, or put their college education to some other use. The NIMH staff defined success as attainment of the independent investigator level.

The Workgroup concluded that as the term “success” is operationalized and trainees are tracked, the various roles and functions that occur

in the pursuit of a mental health research career will graphically unfold into a career life-cycle model. The career life cycle can then more easily be explained to prospective and current trainees by career counselors, mentors, recruiters, and career managers.

### **Box V-B: Model Program II**

An innovative NIMH-funded research training program led by Barbara Marin, University of California, San Francisco joins minority group scientists studying HIV prevention in minority communities with established investigators at mentoring institutions. This program aims to meet several goals: 1) to enhance the quality of HIV prevention research to serve vulnerable ethnic minority populations; 2) to develop culture-specific theoretical models for preventing HIV disease; and 3) to increase the number of minority group members among principal investigators funded by NIH, CDC, and other agencies. The program consists of six components: trainees spend three summer sessions at a host institution where they learn the nuts and bolts of independent research and three academic years that include interaction with NIH and CDC program staff. The academic program also includes seminars on topics extending from preparing and administering actual grant applications to recruiting participants for a study, to ensuring appropriate human subjects protections. The program, which is in place at the Center for AIDS Prevention Studies (CAPS) under a P50 grant mechanism, places special emphasis on identifying and involving research mentors who have experience in and sensitivity to cross-cultural research concerns. Also, at various points throughout the training period, the new investigators have a chance to have their preliminary plans and actual research proposals critiqued by senior scientists from outside their particular fields. This procedure introduces the trainees to the challenges of the actual peer review process. In the latest progress report, CAPS reports on the accomplishments of the 11 trainees (about four per year) who began in 1997, 1998, or 1999: Three of the scientists have secured large multi-year funding for their research, and three investigators have obtained smaller research awards. The other five have either submitted grants for review or are developing grants.



# Chapter VI.

## Action Plan

### **GENERAL CONCLUSIONS AND RECOMMENDATIONS TO INCREASE THE NUMBER OF INDEPENDENT RACIAL/ETHNIC MINORITY RESEARCHERS**

In the 21st century, the Nation faces new challenges and opportunities in health and medical research that will require the attention of the best scientists we can develop, drawing on the interests, talents, and expertise of every sector of our society. The Workgroup urges NIMH to continue its leadership and commitment to training ethnic minority high school and undergraduate students in an effort to attract researchers into the mental health research career pathway. At the same time, the Workgroup assigns special emphasis to the Institute's support of research training at the doctoral, post-doctoral, and investigator levels. Investing in these phases of training will produce not only more scientists dedicated to mental health research but also the mentors, tenured faculty, role models, and other infrastructure elements needed to generate additional independent investigators. This investment will necessitate a strong partnership between NIMH and research and academic institutions by way of institutional support for mentors and trainees.

The Workgroup members also wish to emphasize their belief that a) the creation of a tracking system to monitor the career progression of NIMH-supported trainees through the investigator level is vital; b) long-term mentoring is essential

to the success of minority trainees and investigators; c) the promotion of research career advancement at the pre- and post-doctorate levels is essential to removing barriers that impede transition from one career level to the next; d) the strengthening of networks with educational and industrial partners to meet kindergarten through community college science training objectives that exceed NIMH's resources will increase the potential investigator pool; e) the eventual attainment of racial/ethnic minority group representativeness on scientific review groups will lead to more urgently needed research on health disparities; and f) periodic evaluation of the Action Plan to assess its effects will improve the likelihood of its successful implementation. To build on NIMH's past efforts, the NAMHC Workgroup submits to the Council the following recommendations:

#### **Recommendation No. 1:**

***Create a tracking system to monitor the career progression of NIMH-supported trainees through the investigator level so that training can be optimized based on outcomes.***

The Workgroup recommends the development of a centralized tracking system to enable NIMH to collect and maintain data and information that will afford a better understanding of the numbers and career progression of racial/ethnic minority trainees and scientists. These databases should be overseen by the Office for Special Populations, NIMH, in conjunction with a Racial/Ethnic

Minority Trainee Career Management Program. The tracking system will contribute significantly to understanding factors related to decision points, barriers, and impediments that influence mental health research career decisions for racial/ethnic minority group members and will assist NIMH in monitoring success of particular programs and grant mechanisms. The database should be used to inform trainees about pending educational decision points, associated funding mechanisms, and timelines. Access to a given individual's career file should be restricted to the trainee, to an identified "NIMH career manager," and to the mentor. Toward these ends, the Workgroup urges the following actions:

*ACTION 1.1:* Encourage the voluntary disclosure of racial/ethnic identity for all grantees to permit tracking.

*ACTION 1.2:* Encourage the voluntary disclosure of the Social Security Account Number (SSAN) for all grantees.

*ACTION 1.3:* Develop a confidential database mechanism to collect the racial/ethnic identity and SSANs of all trainees and grantees funded by NIH/NIMH and use the information contained therein to evaluate the NIMH portfolio.

*ACTION 1.4:* Develop a career management file to monitor the progression of trainees funded by NIH/NIMH mechanisms.

*ACTION 1.5:* Ensure that the database system protects the privacy of grantees and research participants.

*ACTION 1.6:* Inform each trainee and investigator listed on the database about NIMH criteria and procedures regarding the collection, maintenance,

storage method, retention period, and disposal processes for their personal information.

**Recommendation No. 2:**  
***Establish a national mental health research mentorship program devoted to training racial/ethnic minority investigators.***

The Workgroup recommends the creation of a national mentoring network of senior minority and non-minority investigators. The national network would develop extended relationships with minority trainees and investigators to help them transition to the next level of their career development. The mentorship process is understood to be a labor-intensive activity that typically involves an experienced scientist and a small number of protégés engaged in a set of focused research projects.

Innovative mentorship arrangements are encouraged to include collaborative efforts between researchers at class I and II institutions and other colleges/universities, and distant learning mentorships with support for recurring face-to-face meetings. As the pool of trainees and junior investigators increases, the pool of mentors must likewise increase. The Workgroup recognizes that mentorship duties can deflect mentors from the organizational duties their institutions expect them to perform. These institutions are becoming more interested in receiving the full performance from the mentor or compensation for time the individual devotes to mentoring. Accordingly, the Workgroup suggests that a viable national mental health research mentorship infrastructure would be more successful if a mechanism were to be developed to facilitate the involvement of mentors/institutions in working with students; these efforts could entail reimbursement for expenses associated with the mentorship process.

The Workgroup also believes that the development of categorical segments of the

racial/ethnic minority investigator training “pipeline” (e.g., high school, community college, dual degree, health disparities research, Native American tribal colleges [Appendix G], predominantly African American colleges and universities [Appendix H], and Hispanic-serving institutions [Appendix I]) would assist new mentors in their selection of protégés. Thus the Workgroup urges the following actions:

*ACTION 2.1:* Develop a national network of senior minority and non-minority investigators to develop extended relationships with minority trainees and investigators to help them transition to the next level of their career development. Successful mentorship requires that the training take place in the context of specific research projects. The program should enlist the Nation’s most distinguished scientists, scholars, and industrial partners by providing tangible (e.g., salary or honoraria) and intangible (e.g., National, State, and NIH recognition, honors, and awards) incentives (see description of Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, NSTC, 2000).

*ACTION 2.2:* Establish a 1-800 support and referral line staffed by trained NIMH personnel to provide to any racial/ethnic minority trainee or investigator with immediate, short-term assistance with regard to research questions and career development.

*ACTION 2.3:* Foster and develop an array of mentoring/education programs (e.g., sample model programs) using existing research and training mechanisms (e.g., R25 or the Mental Health Education Grant) in creative and flexible ways to meet specific needs of minority trainees and investigators. Suitable uses of these awards might be to further develop research proposals

and manuscripts, to help minority investigators reenter the research enterprise and/or switch fields, and to address health disparities.

*ACTION 2.4:* Endorse and nurture distant mentorship relations with incentive packages that provide such items as communications connectivity, support for periodic travel, and supplies for mentors and protégés located at different institutions, agencies, or industrial locations.

*ACTION 2.5:* Encourage, through expense reimbursement and other means, mentors of minority investigators.

*ACTION 2.6:* Increase the number of technical assistance workshops involving minority trainees and investigators (and mentors) to stimulate post-doctoral trainee interest in mental health/health disparities research.

### **Recommendation No. 3: *Concentrate more new resources at the later stages (post-doctoral and beyond) of career development.***

Given the complexity of research today, most trainees need and benefit from post-doctoral training and supervised research career development if they are to realize their full capacity to do independent, innovative research.

To complement the emphasis of the proposed national mentorship program that is directed at the later years of career development, the Workgroup recommends the following actions:

*ACTION 3.1:* Implement “loan forgiveness” or a loan repayment plan for any trainee who pursues a dual degree (i.e., M.D.- Ph.D., M.D.-M.P.H.),

especially in critical shortage areas such as child psychiatry.

*ACTION 3.2:* Promptly reevaluate applicants with promising proposals who “just missed the pay

line” and/or need relatively little time and technical assistance to refine and resubmit highly competitive applications.

*ACTION 3.3:* Develop a strategic plan that allows grantsmanship training for extramural post-doctorate level scientists (e.g., Intramural Research Program Grant-Writing Workshop Series) to help reduce the time it takes to obtain an independent investigator grant (R01).

*ACTION 3.4:* Provide additional post-doctoral slots to NIMH-funded Minority Fellowship Programs to increase the rate of their demonstrated productivity and more quickly infuse the proposed national minority mental health research mentorship infrastructure.

*ACTION 3.5:* Encourage the Minority Supplements to include clearly delineated research relationships between principal investigators and more senior supplementees who work at institutions some distance apart.

#### **Recommendation No. 4:**

***Encourage new and strengthen existing networks and partnerships to enhance science training goals that exceed NIMH resource capabilities.***

To complement the emphasis of the national mentorship program in the later years of career development, the Workgroup recommends that NIMH establish and strengthen existing national alliances and partnerships with a wide variety of institutions, including private industry, to

promote science careers, with particular attention to the earlier years of development (kindergarten through community college). To effect these recommendations NIMH is urged to implement these actions:

*ACTION 4.1:* Network with institutes and programs that invest in the career identification and academic development of promising students in grades K-12 to stimulate early interest in a mental health research career. Provide information about the full spectrum of mental health research career fields. The networks should be linked with institutes and organizations such as the Department of Education, Department of Justice, National Institute of General Medical Sciences, National Science Foundation, private foundations, and other neuroscience and behavioral science institutes.

*ACTION 4.2:* Encourage linkages among the NIMH, the Nation’s community colleges, and four-year institutions with large numbers of underrepresented minority students (e.g., Native American tribal colleges, Hispanic-serving institutions, and predominantly African American colleges and universities). These linkages will strengthen, in turn, ties between the NIMH high school and baccalaureate training programs.

*ACTION 4.3:* Enhance linkages with the minority fellowship programs to access career development and progression data that denote the efficacy and effectiveness of minority fellowship programs.

*ACTION 4.4:* Encourage research training institutions, editorial boards, foundations, and so on to promote research, research training, and publication to promote issues related to the mental health of racial/ethnic minority communities.

## **Recommendation No. 5:**

***NIMH is encouraged to a) ascertain that Initial Review Group memberships are diverse and, where relevant, possess expertise needed to evaluate research in minority populations/communities and b) enforce sanctions for programs that fail to attract racial/ethnic minority trainees when such criteria are stipulated in the funding mechanism.***

It is essential that members of scientific review groups not only have the expertise to judge the merit of the research methodologies and conceptual frameworks, but also have the expertise to judge the appropriateness of the methodologies and theories for use with racially/ethnically diverse populations. It is expected that this diverse body of scientists will possess the requisite knowledge of racial/ethnic and cultural nuances associated with mental illness, mental health, health disparities, and mental health research to allow rigorous, fair peer review.

*ACTION 5.1:* Continue to vigorously pursue efforts to increase racial/ethnic minority representation on Initial Review Groups and encourage health disparities research.

*ACTION 5.2:* Using the most current available data, orient Initial Review Groups (IRGs), journal editors, and academia to the issues of culture, race, and ethnicity in mental health research, and encourage IRGs to be particularly open to research proposals in areas where gaps in knowledge and health disparities are known to exist.

*ACTION 5.3:* Encourage reviewers to closely monitor and apply existing policies that require them to rate applications based on the success or failure of training programs and research studies

to address minority representation among trainees and research participants.

*ACTION 5.4:* Increase prioritization for highly meritorious applications that address health disparities when they are evenly ranked by peer review with applications not proposing health disparities research.

## **Recommendation No. 6:**

***We encourage NIMH to conduct an annual review of plans for racial/ethnic diversity in mental health research careers and of the strategic plan for reducing health disparities to assess progress made in implementing the action plans. NIMH should then report its findings to NAMHC.***

## **Concluding Comment**

At the dawn of the 21st century, the Nation is poised to take quantum leaps in discoveries that increase scientific knowledge about human behavior, the brain, diagnostics, pharmaceuticals, communications, and many other issues that affect the well-being of its people. The Workgroup believes that the knowledge gained through scientific inquiry must reflect the input of the diversity of intellectual capital this country enjoys. Therefore, it is imperative that participants in the scientific enterprise represent all Americans.

In that regard, the NAMHC Workgroup on Racial/Ethnic Diversity Research Training and Health Disparities offers this plan as a means of achieving practical success in increasing the number of racial/ethnic minority independent investigators and in reducing health disparities in the United States.



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# Appendices

## Appendix A

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## **Appendix C**

### ***NATIONAL ADVISORY MENTAL HEALTH COUNCIL***

(All Terms End 9/30)

***Department of Health and Human Services***

***National Institutes of Health***

***National Institute of Mental Health***

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## Appendix D

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## Appendix F

### **RESEARCH TRAINING AND DEVELOPMENT TIMETABLE**

Career Stage	Frequently Used Mechanisms <sup>1</sup> – Program Title
<b>High School/ Undergraduate Students</b>	<ul style="list-style-type: none"> <li>•R25 NIMH Career Opportunities in Research (COR) Honors High School Research<sup>2</sup></li> <li>•T34 NIMH Career Opportunities in Research (COR) Honors Undergraduate Research Training Grant<sup>2</sup></li> <li>•R25 Mental Health Education Grants</li> <li>•RPG<sup>3</sup> Research Supplements for Underrepresented Minorities<sup>2</sup></li> </ul>
<b>Graduate/ Medical Students</b>	<ul style="list-style-type: none"> <li>•T32 NRSA Institutional Research Training Grants</li> <li>•T32 Jointly Sponsored NIH Pre-Doctoral Training Program in the Neurosciences</li> <li>•T32 Underrepresented Minority Fellowship Programs in Mental Health<sup>2</sup></li> <li>•F30 Individual Pre-Doctoral NRSA for M.D./Ph.D. Fellowships</li> <li>•F31 NRSA for Individual Predoctoral Fellowships</li> <li>•F31 NIH Pre-Doctoral Fellowship Awards for Minority Students<sup>2</sup></li> <li>•R03 Underrepresented Minority Dissertation Research Grants<sup>2</sup></li> <li>•R25 Mental Health Education Grants</li> <li>•RPG<sup>3</sup> Research Supplements for Underrepresented Minorities<sup>2</sup></li> </ul>
<b>Post-Doctoral/ Clinical Residency</b>	<ul style="list-style-type: none"> <li>•T32 NRSA Institutional Research Training Grants</li> <li>•T32 Underrepresented Minority Fellowship Programs in Mental Health<sup>2</sup></li> <li>•F32 NRSA for Individual Post-Doctoral Fellows</li> <li>•K01 Mentored Research Scientist Development Award</li> <li>•K08 Mentored Clinical Scientist Development Award</li> <li>•K23 Mentored Patient-Oriented Research Career Development Award</li> <li>•R25 Mental Health Education Grants</li> <li>•RPG<sup>3</sup> Research Supplements for Underrepresented Minorities<sup>2</sup></li> </ul>
<b>Independent Scientists: “Early” “Middle” “Senior”</b>	<ul style="list-style-type: none"> <li>•R03 NIMH Small Grants Program</li> <li>•R03 Behavioral Science Track Award for Rapid Transition (B/START)</li> <li>•R25 Mental Health Education Grants</li> <li>•RPG<sup>3</sup> Research Supplements for Underrepresented Minorities<sup>2</sup></li> <li>•K01 Scientist Development Award for New Minority Faculty<sup>2</sup></li> <li>•R21 Exploratory/Developmental Grant</li> <li>•R01 Investigator Initiated Research Project Grant</li> <li>•R24 Minority Research Infrastructure Support Program<sup>2</sup></li> <li>•K02 Independent Scientist Award</li> <li>•K24 Midcareer Investigator Award in Patient-Oriented Research</li> <li>•K05 Senior Scientist Award</li> </ul>

<sup>1</sup> For additional programs and links to specific announcements, please go to:

<http://www.nimh.nih.gov/grants/training.cfm>

<sup>2</sup> Training and career development programs for underrepresented minorities

<sup>3</sup> Research Project Grants, including R01, R03, R15, R21, R37, P01, P30, P50, and others (see announcement for additional mechanisms and specific provisions).

## Appendix G

### ***NATIVE AMERICAN COLLEGES***

The following colleges are affiliated with the American Indian College Fund, which provided the list to the cited reference.\*

Bay Mills Community College  
Route One, Box 315A  
Brimley, MI 49715

Blackfeet Community College  
P.O. Box 819  
Browning, MT 59417

Cheyenne River Community College  
P.O. Box 220  
Eagle Butte, SD 57625

College of the Menominee Nation  
P.O. Box 1179  
State Highway 47/55  
Keshena, WI 54135

Crownpoint Institute of Technology  
P.O. Box 649  
Crownpoint, NM 87313

D-Q University  
P.O. Box 409  
Davis, CA 95617

Dull Knife Memorial College  
P.O. Box 98  
Lame Deer, MT 59043

Fond du Lac Tribal and Community  
College  
2101 14th Street  
Cloquet, MN 55720

Fort Berthold Community College  
P.O. Box 490  
New Town, ND 58763

Fort Peck Community College  
P.O. Box 398  
Poplar, MT 59255

Haskell Indian Nations University  
155 Indian Avenue  
Lawrence, KS 66044

Institute of American Indian Arts  
P.O. Box 20007  
Santa Fe, NM 87504

Lac Court Oreilles Ojibwa Community College  
RR 2, Box 2357  
Hayward, WI 54843

Leech Lake Tribal College  
Route 3, Box 100  
Cass Lake, MN 56633

Little Big Horn College  
P.O. Box 370  
Crow Agency, MT 59022

Little Hoop Community College  
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Fort Totten, ND 58335

Navajo Community College  
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Tsaile, AZ 86556

Nebraska Indian Community College  
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Northwest Indian College  
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Oglala Lakota College  
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Salish Kootenai College  
P.O. Box 117  
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\*Multicultural Student's Guide to Colleges  
(see Reference List)

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P.O. Box 490  
Rosebud, SD 57570

Sisseton Wahpeton Community College  
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Sisseton, SD 57262

Southwest Indian Polytechnic Institute  
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Standing Rock College  
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Stone Child Community College  
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S. D. Bishop State Junior College  
Mobile, AL 36690  
(205) 690-6412

Concordia College  
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Lawson State Community College  
Birmingham, AL 35221  
(205) 925-1666

Lomax-Hannon Junior College  
Greenville, AL 36037  
(205) 382-6605

Miles College\*  
Birmingham, AL 35208  
(205) 923-2771

Oakwood College\*  
Huntsville, AL 35896  
(205) 837-1630

Selma University  
Selma, AL 36701  
(205) 872-2533

Stillman College\*  
Tuscaloosa, AL 35403  
(205) 349-4240

Talladega College\*  
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University of Arkansas/Pine Bluff  
Pine Bluff, AR 71601  
(501) 541-6500

#### **DELAWARE (1)**

Delaware State College  
Dover DE 19901  
(302) 736-4901

#### **DISTRICT OF COLUMBIA (2)**

Howard University  
Washington, DC 20059  
(202) 806-2752

University of the District of Columbia  
Washington, DC 20008  
(202) 282-7550

#### **FLORIDA (4)**

Bethune-Cookman College\*  
Daytona Beach, FL 32015  
(904) 255-1401

\*Members of the United Negro College Fund, which provided the information in this list to the cited reference.

\*\*Multicultural Student's Guide to Colleges (see Reference List)

Edward Waters College\*  
Jacksonville, FL 32209  
(904) 355-3030

Florida A & M University  
Tallahassee, FL 32307  
(904) 599-3225

Florida Memorial College\*  
Miami, FL 33054  
(305) 625-4141

### **GEORGIA (10)**

Albany State College  
Albany, GA 31705  
(912) 439-4095

Clark Atlanta University\*  
Atlanta, GA 30314  
(404) 880-8000

The Fort Valley State College  
Fort Valley, GA 31030  
(912) 825-6315

Interdenominational Theological Center\*  
Atlanta, GA 30314  
(404) 522-1772

Morehouse College\*  
Atlanta, GA 30314  
(404) 681-2800

Morehouse School of Medicine  
Atlanta, GA 30310  
(404) 752-1500

Morris Brown College\*  
Atlanta, GA 30314  
(404) 525-7831

Paine College\*  
Atlanta, GA 30910  
(404) 722-4471

Savannah State College  
Savannah, GA 31404  
(404) 525-7831

Spelman College\*  
Atlanta, GA 30314  
(404) 681-1143

### **KENTUCKY (2)**

Kentucky State University  
Frankfort, KY 40601  
(502) 564-2550

Simmons University Bible College  
Louisville, KY 40210  
(502) 776-1443

### **LOUISIANA (6)**

Dillard University\*  
New Orleans, LA 70122  
(504) 283-8822

Grambling State University  
Grambling, LA 71245  
(318) 247-6941

Southern University System  
Baton Rouge, LA 70813  
(504) 771-4680

Southern University/New Orleans  
New Orleans, LA 70126  
(504) 486-7411

Southern University/Shreveport  
Shreveport, LA 71107  
(318) 674-3300

Xavier University\*  
New Orleans, LA  
(504) 483-7577

### **MARYLAND (4)**

Bowie State College  
Bowie, MD 20715  
(301) 464-3000

Coppin State College  
Baltimore, MD 21216  
(301) 383-4500

Morgan State University  
Baltimore, MD 21239  
(301) 444-3333

University of Maryland/Eastern Shore  
Princess Anne, MD 21853  
(301) 651-2200

**MICHIGAN (1)**

Shaw College at Detroit  
Detroit, MI 48202  
(313) 873-7920

**MISSISSIPPI (11)**

Alcorn State University  
Loman, MS 39096  
(601) 877-6100

Coahoma Junior College  
Clarksdale, MS 38614  
(601) 627-2571

Jackson State University  
Jackson, MS 39217  
(601) 968-2121

Mary Holmes College  
West Point, MS 39773  
(601) 494-6820

Mississippi Industrial College  
Holy Springs, MS 38835  
(601) 252-1750

Mississippi Valley State University  
Itta Bena, MS 38941  
(601) 254-9041

Natchez Junior College  
Natchez, MS 39120  
(601) 792-5175

Prentiss Normal and Industrial Institute  
Prentiss, MS 39474  
(601) 792-5175

Rust College\*  
Holly Springs, MS 38635  
(601) 252-4661

Tougaloo College\*  
Tougaloo, MS 39174  
(601) 956-4941

Utica Junior College  
Utica, MS 39175  
(601) 886-8085

**MISSOURI (2)**

Harris-Stowe State College  
St. Louis, MO 63103  
(314) 533-3366

Lincoln University  
Jefferson, MO 65101  
(314) 751-2325

**NORTH CAROLINA (11)**

Barber-Scotia College\*  
Concord, NC 28025  
(704) 789-2900

Bennett College\*  
Greensboro, NC 27402  
(919) 273-4431

Elizabeth City State University  
Elizabeth City, NC 27909  
(919) 335-0551

Fayetteville State University  
Fayetteville, NC 28301  
(919) 486-1141

Livingstone College\*  
Salisbury, NC 28144  
(704) 633-7960

Johnson C. Smith University\*  
Charlotte, NC 28216  
(704) 378-1000

North Carolina A&T University  
Greensboro, NC 27411  
(919) 379-7500

North Carolina Central University  
Durham, NC 27707  
(919) 683-6100

St. Augustine's College\*  
Raleigh, NC 27611  
(919) 828-4451

Shaw University\*  
Raleigh, NC 27611  
(919) 755-4920

Winston-Salem State University  
Winston-Salem, NC 27110  
(919) 761-2011

**OKLAHOMA (1)**

Langston University  
Langston, OK 73050  
(405) 466-2231

**PENNSYLVANIA (2)**

Cheyney University  
Cheyney, PA 19319  
(215) 758-6332

Lincoln University  
Lincoln University, PA 19352  
(215) 932-8300

**SOUTH CAROLINA (8)**

Allen University  
Columbia, SC 29204  
(803) 254-4156

Benedict College\*  
Columbia, SC 29204  
(803) 256-4420

Clafin College\*  
Orangeburg, SC 29115  
(803) 256-2710

Clinton Junior College  
Rock Hill, SC 29732  
(803) 327-7402

Denmark Technical College  
Denmark, SC 29042  
(803) 793-3301

Morris College\*  
Sumter, SC 29150  
(803) 775-9371

South Carolina State College  
Orangeburg, SC 29115  
(803) 536-7013

Voorhees College\*  
Denmark, SC 29042  
(803) 793-3351

**TENNESSEE (7)**

Fisk University\*  
Nashville, TN 37203  
(615) 329-8500

Knoxville College\*  
Knoxville, TN 37914  
(615) 524-6514

Lane College\*  
Jackson, TN 38301  
(901) 424-4600

LeMoyne-Owen College\*  
Memphis, TN 38126  
(901) 774-9090

Meharry Medical College  
Nashville, TN 37208  
(615) 327-6111

Morristown College  
Morristown, TN 37208  
(615) 586-5282

Tennessee State University  
Nashville, TN 37203  
(615) 320-3432

**TEXAS (9)**

Bishop College\*  
Dallas, TX 75241  
(214) 372-8000

Huston-Tillotson College\*  
Austin, TX 78702  
(512) 476-7421

Jarvis Christian College\*  
Hawkins, TX 75765  
(214) 769-2174

Paul Quinn College\*  
Waco, TX 76704  
(817) 752-5891

Prairie View A & M University  
Prairie View, TX 77445  
(409) 857-3311

Southwestern Christian College  
Terrell, TX 75160  
(214) 563-3341

Texas College\*  
Tyler, TX 75703  
(214) 593-8311

Texas Southern University  
Houston, TX 77004  
(713) 527-7036

Wiley College\*  
Marshall, TX 75670  
(214) 938-8341

**VIRGINIA (6)**  
Hampton Institute  
Hampton, VA 23668  
(804) 727-5231

Norfolk State University  
Norfolk, VA 23504  
(804) 623-8760

St. Paul's College\*  
Lawrenceville, VA 23868  
(804) 848-4451

The Virginia Seminary and College  
Lynchburg, VA 24501  
(804) 520-6572

Virginia State University  
Petersburg, VA 23220  
(804) 257-5600

Virginia Union University  
Richmond, VA 23220  
(804) 257-5600

**WEST VIRGINIA (1)**  
West Virginia State College  
Institute, WV 25112  
(304) 766-3111

**VIRGIN ISLANDS (1)**  
College of the Virgin Islands  
St. Thomas, VI 00801  
(809) 774-9200

## **Appendix I**

### ***HISPANIC-SERVING COLLEGES AND UNIVERSITIES***

The following list names colleges and universities where Hispanic student enrollment constitutes a minimum of 25% of the student body.\*

#### ***ARIZONA (3)***

Arizona Western College  
Yuma, AZ 85366  
(502) 344-7618

Pima Community College (Downtown Campus)  
Tucson, AZ 85709-3100  
(602) 884-6788

South Mountain Community College  
7050 South 24th Street  
Phoenix, AZ 85040  
(602) 243-8150

#### ***CALIFORNIA (26)***

California State University/Bakersfield  
9001 Stockdale Highway  
Bakersfield, CA 93311-1099  
(805) 664-2241

California State University/Fresno  
5241 North Maple Avenue  
Fresno, CA 93740-0048  
(209) 278-2324

California State University/Los Angeles  
5151 State University Drive  
Los Angeles, CA 90032  
(213) 343-3030

Cerritos College  
11110 East Alondra Boulevard  
Norwalk, CA 90650  
(310) 860-2451

College of the Sequoias  
Mooney Boulevard  
Visalia, CA 93277  
(209) 730-3731

Compton Community College  
111 East Artesia Boulevard  
Compton, CA 90221  
(310) 637-2660

Don Bosco Technical Institute  
1151 San Gabriel Boulevard  
Rosemead, CA 91770  
(818) 280-0451

East Los Angeles College  
1301 Avenue Cesar Chavez  
Monterey, CA 91754  
(213) 265-8662

Gavilan College  
5055 Santa Teresa Boulevard  
Gilroy, CA 95020  
(408) 848-4712

Hartnell College  
156 Homestead Avenue  
Salinas, CA 93901  
(408) 755-6900

Imperial Valley College  
P.O. Box 158, 380 East Eten Road  
Imperial, CA 92251  
(619) 355-6219

Kings River Community College  
995 North Reed Avenue  
Reedley, CA 93654  
(209) 953-4000

Los Angeles City College  
855 North Vermont Avenue  
Los Angeles, CA 90029  
(213) 953-4000

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\*Multicultural Student's Guide to Colleges  
(see Reference List)

Los Angeles Harbor College  
1111 Figueroa Place  
Wilmington, CA 90744  
(310) 522-8200

Los Angeles Mission College  
13356 Eldridge Avenue  
Sylmar, CA 91342  
(818) 364-7600

Los Angeles Trade-Technical  
400 West Washington Boulevard  
Los Angeles, CA 90015  
(213) 744-9000

Mount St. Mary's College  
12001 Chalon Road  
Los Angeles, CA 90049  
(310) 471-9500

Mount St. Antonio College  
1100 North Grand Avenue  
Walnut, CA 91789-1399  
(909) 594-5611

Oxnard College  
4000 South Rose Avenue  
Oxnard, CA 93033  
(805) 488-0911

Palo Verde College  
811 West Chanslorway  
Blythe, CA 92225  
(619) 922-6168

Rancho Santiago Community College  
1530 West 17th Street  
Santa Ana, CA 92706  
(714) 564-6450

Rio Hondo College  
3600 Workman Mill Road  
Whittier, CA 90608  
(310) 908-3403

San Bernardino Valley College  
701 South Mount Vernon Avenue  
San Bernardino, CA 92410  
(909) 888-6511

San Diego State University/Imperial  
Valley Campus  
720 Herber Avenue  
Calexico, CA 92231  
(619) 482-6301

Southwestern College  
900 Otay Lakes Road  
Chula Vista, CA 91910  
(619) 482-6301

West Hills Community College  
300 Cherry Lane  
Coalinga, CA 93210  
(209) 935-0801

### ***COLORADO (4)***

Community College of Denver  
P.O. Box 172263  
Denver, CO 80217  
(303) 556-2600

Otero Junior College  
La Junta, CO 81050  
(303) 384-8721

Pueblo Community College  
900 West Orman Avenue  
Pueblo, CO 81004  
(719) 549-3213

Trinidad State Junior College  
600 Prospect Street  
Trinidad, CO 81082  
(719) 846-5011

### ***FLORIDA (10)***

Barry University  
11300 N.E. Second Avenue  
Miami Shores, FL 33161  
(305) 899-3010

Florida International University Park, PC 528  
Miami, FL 33199  
(305) 348-2111

Miami-Dade Community College/  
Homestead Campus  
500 College Terrace  
Homestead, FL 33030  
(305) 237-5010

Miami-Dade Community College/Kendall Campus  
11011 S.W. 104th Street  
Miami, FL 33176  
(305) 237-2222

Miami-Dade Community College/Medical Center  
Campus  
950 N.W. 20th Street  
Miami, FL 33127  
(305) 237-4025

Miami-Dade Community College/North Campus  
11380 N.W. 27th Avenue  
Miami, FL 33167  
(305) 237-1153

Miami-Dade Community College/Wolfson  
Campus 300 N.E. Second Avenue, Room 1301  
Miami, FL 33132-2297  
(305) 237-3221

St. John Vianney College Seminary  
2900 S.W. 87th Avenue  
Miami, FL 33165-3244  
(305) 223-4561

St. Thomas University  
16400 N.W. 32nd Avenue  
Miami, FL 33054  
(305) 628-6663

St. Vincent de Paul Regional Seminary  
10701 South Military Trail  
Boynton Beach, FL 33436  
(407) 732-4424

### **ILLINOIS (5)**

Harry S. Truman College  
1145 West Wilson Avenue  
Chicago, IL 60640  
(312) 989-6120

MacCormac Junior College  
615 North West Avenue  
Elmhurst, IL 60126  
(312) 922-1884

Richard J. Daley College  
7500 South Pulaski Road  
Chicago, IL 60652  
(312) 838-7511

Robert Morris College  
180 North La Salle Street  
Chicago, IL 60601  
(312) 836-4888

St. Augustine College  
1333 West Argyle  
Chicago, IL 60640

### **NEW JERSEY (2)**

Hudson Community College  
168 Sip Avenue  
Jersey City, NJ 07306  
(201) 714-2100

Passaic County Community College  
One College Boulevard  
Paterson, NJ 07505  
(201) 684-5900

### **NEW MEXICO (13)**

Albuquerque T-VI: A Community College  
525 Buena Vista, SE  
Albuquerque, NM 87106  
(505) 224-4411

College of Santa Fe  
1600 St. Michael's Drive  
Santa Fe, NM 87505  
(505) 473-6234

Don Ana Branch Community College  
3400 South Espina Street  
Las Cruces, NM 88003-8001  
(505) 527-7510

Eastern New Mexico University/Roswell  
Box 600, 52 University  
Roswell, NM 88202-6000  
(505) 624-7111

Luna Vocational Technical Institute  
P.O. Drawer K  
Las Vegas, NM 87701  
(505) 454-2500

New Mexico Highlands University  
National Avenue  
Las Vegas, NM 87701  
(505) 454-3270

New Mexico State University/Grants Campus  
1500 3rd Street  
Grants, NM 87020  
(505) 287-7981

New Mexico State University/Main Campus  
Box 3Z  
Las Cruces, NM 88003  
(505) 646-2035

Northern New Mexico Community College  
1002 North Onate Street  
Española, NM 87532  
(505) 747-2140

Santa Fe Community College  
P.O. Box 4187  
Santa Fe, NM 87502-4187  
(505) 438-1201

University of New Mexico  
Scholes Hall, Room 160  
Albuquerque, NM 87131-0001

University of New Mexico  
Valencia Campus  
280 La Entrada  
Los Lunas, NM 87031  
(505) 865-1639

Western New Mexico University  
1000 West College Avenue  
Silver City, NM 88061  
(505) 538-6239

**NEW YORK (10)**

Boricua College  
3755 Broadway  
New York, NY 10032  
(212) 694-1000

Borough of Manhattan Community College  
199 Chambers Street  
New York, NY 10007-1079  
(212) 346-8800

Bronx Community College  
University Avenue and 181st Street  
Bronx, NY 10453  
(718) 220-6920

City College  
Convent Avenue at 138th Street  
New York, NY 10031  
(212) 650-7000

College of Aeronautics  
La Guardia Airport Station  
Flushing, NY 11371  
(718) 429-6600

Herbert H. Lehman College  
250 Bedford Park Boulevard West  
Bronx, NY 10468  
(718) 960-8111

Hostos Community College  
475 Grand Concourse  
Bronx, NY 10451  
(718) 518-4444

John Jay College of Criminal Justice  
899 10th Avenue  
New York, NY 10019  
(212) 237-8600

La Guardia Community College  
30-10 Thomson Avenue, M147  
Long Island City, NY 11101  
(718) 482-5050

Mercy College  
555 Broadway  
Dobbs Ferry, NY 10522  
(914) 674-7369

**TEXAS (23)**

Alamo Community College District  
811 West Houston, Suite 212  
San Antonio, TX 78207-3033  
(210) 220-1520

Bee County College  
3800 Charco Road  
Beeville, TX 78102  
(512) 358-3130

Del Mar College  
101 Baldwin  
Corpus Christi, TX 78404  
(512) 886-1203

El Paso Community College District  
919 Hunter Drive  
El Paso, TX 79915  
(915) 594-2112

Incarnate Word College  
4301 Broadway  
San Antonio, TX 78209  
(212) 829-3900

Laredo Community College  
West End, Washington Street  
Laredo, TX 78040  
(210) 721-5101

Our Lady of the Lake University  
411 SW 24th Street  
San Antonio, TX 78207-4689  
(210) 434-6711

Palo Alto College  
1400 West Villaret  
San Antonio, TX 78224-2499  
(210) 921-5260

St. Edward's University  
3001 South Congress Avenue  
Austin, TX 78704-6489  
(512) 448-8411

St. Mary's University  
One Camino Santa Maria  
San Antonio, TX 7829-8572

St. Philip's College  
1801 Martin Luther King Drive  
San Antonio, TX 78203-2098  
(210) 531-3200

San Antonio College  
1300 San Pedro  
San Antonio, TX 78284  
(210) 733-2190

Southwest Texas Junior College  
Gamerfield Road  
Uvalde, TX 78801  
(210) 278-4401

Sul Ross State University  
Box C-114  
Alpine, TX 79832  
(915) 837-8032

Texas A&M International University  
5201 University  
Laredo, TX 7804  
(210) 326-2001

Texas A&M University/Corpus Christi  
6300 Ocean Drive  
Corpus Christi, TX 78412  
(512) 994-2621

Texas A&M University/Kingsville Campus  
Box 101  
Kingsville, TX 78363  
(512) 595-3207

Texas State Technical College/Harlingen  
P.O. Box 2628  
Harlingen, TX 78550  
(210) 425-0601

University of Houston/Downtown  
One Main Street  
Houston, TX 77002  
(713) 221-8001

University of Texas/Brownsville  
80 Fort Brown  
Brownsville, TX 78520  
(512) 544-8231

University of Texas/El Paso  
500 West Street  
El Paso, TX 79968  
(915) 747-5555

University of Texas/Pan American  
1201 West University Drive  
Edinburg, TX 78539  
(210) 381-2101

University of Texas/San Antonio  
6900 North Loop, 1604 West  
San Antonio, TX 78249-0601  
(210) 691-4101

## Figure, Table, and Box References

Figure II. Source: National Science and Technology Council, "Ensuring a Strong U.S. Scientific, Technical, and Engineering Workforce in the 21st Century," 2000.

Figure III-A. Sources: The Chronicle of Higher Education Almanac, September 1, 2000, p.38. National Academy of Sciences (1995). Summary Report 1993: Doctorate Recipients from United States Universities, Washington, DC. U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000.

Figure III-B. Source: U.S. Department of Education, National Center for Education Statistics (1997). Integrated Postsecondary Education Data System, Fall Staff Survey.

Figure III-C. Sources: U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000. The Chronicle of Higher Education Almanac, September 1, 2000, p.24 and the National Center for Education Statistics, Integrated Postsecondary Data System.

Table III. Source: National Center for Education Statistics, Integrated Postsecondary Education System.

Table IV-A. Source: National Institutes of Health.

Table IV-B. Source: National Institutes of Health.

Figure IV-A. Source: National Institute of Mental Health.

Table IV-C. Source: National Institutes of Health.

Figure IV-B. Sources: National Institute of Mental Health and U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000.

Figure IV-C. Source: National Institutes of Health.

Figure IV-D. Sources: National Institute of Mental Health; U.S. Census Bureau, Population Estimates, Population Division, August 23, 2000; and National Center for Education Statistics, Integrated Postsecondary Education Data System, Consolidated Survey.

Box V-A. Source: Dr. Linda Burton, Pennsylvania State University, 2000.

Box V-B. Source: Dr. Barbara Marin, University of California, San Francisco, 2000.



